

Fiberglass Reinforced Polymer
CATALOGUE



INDEX

| | | |
|----|--------------------------|----|
| 01 | ABOUT US | 2 |
| 02 | GRATINGS | 4 |
| | STANDARD IFR/VFR LINE | 16 |
| | PREMIUM ISO/VIN LINE | 20 |
| | CONDUCTIVE CFR LINE | 24 |
| | POTABLE WATER ACS LINE | 28 |
| | MARINADECK | 30 |
| | STEPS AND STEP COVERS | 32 |
| | DUCTS AND MANHOLES | 36 |
| | ACCESSORIES FOR GRATINGS | 40 |
| 03 | PULTRUDED PROFILES | 46 |
| 04 | HANDRAIL SYSTEMS | 56 |
| 05 | LADDERS | 62 |
| 06 | FENCES | 74 |
| 07 | GATES | 78 |
| 08 | COMPLEX STRUCTURES | 82 |
| 09 | THREADED RODS | 86 |
| 10 | LAMINATED SHEETS | 90 |

01

ABOUT US



Since its inception in 1977, M.M. has been operating in the **glass fibre reinforced plastics (FRP)** industry, producing **high quality gratings and structures** (handrail systems, walkways, stairways, ladders, fences, gates, etc.). The intrinsic properties of FRP allow to create light, resistant and easy to install structures that do not require maintenance and are characterised by great versatility of use.

The company offers **customized solutions and additional services** such as technical design, structural calculation for composite materials, chemical and mechanical resistance tests, any type of cut to size, shaping and finishing.

Every phase of the company process, from design to production, from the quotation to the follow-up service, is focused on **customer satisfaction**.

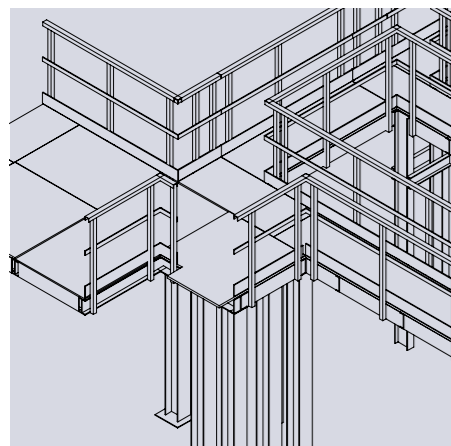
HIGH QUALITY RAW MATERIALS

CUSTOMIZED SOLUTIONS

RESEARCH AND INNOVATION

SERVICES

ENGINEERING



MECHANICAL TESTS



CHEMICAL RESISTANCE TEST



CUTTING AND SHAPING



SURFACE TREATMENTS



VERIFICATION OF PRODUCT CONFORMITY





Gratings are produced using the **resin transfer moulding technology (RTM)**.

They are available in a **wide range of sizes**, thus ensuring a prompt solution to widely differing tasks, and are made of very simple and quick to install monolithic panels.

Gratings are designed with a high safety factor and produced under the most strict controls according to **DIN 24537-3**.

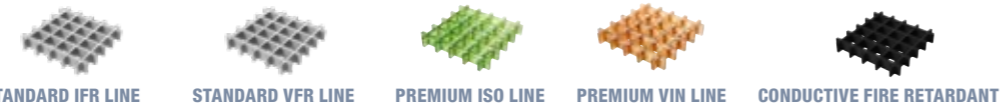
RESIN TYPES

WIDE RANGE OF SIZES

DIFFERENT FINISHINGS

HOW TO CHOOSE THE GRATING

The following table details the characteristics of the resins that allows to choose the right type of grating on the basis of their application and the environment in which it is to be installed.



| | STANDARD IFR LINE | STANDARD VFR LINE | PREMIUM ISO LINE | PREMIUM VIN LINE | CONDUCTIVE FIRE RETARDANT |
|---|------------------------------|--------------------------------|-------------------------|-------------------------|------------------------------|
| CHEMICAL CHARACTERISTICS | | | | | |
| TYPE OF RESIN | self-extinguishing polyester | self-extinguishing vinyl ester | isophthalic | vinylester | self-extinguishing polyester |
| HDT (ISO 75) | 70 °C | 105 °C | 90 °C | 105 °C | 70 °C |
| VITREOUS TRANSITION TEMPERATURE (ASTM D3418) | 90 °C | 125 °C | 110 °C | 125 °C | 90 °C |
| PH RANGE | 4-10 | 3-12 | 3-12 | 1-14 | 4-10 |
| TEMPERATURE RANGE | -50 +60 °C | -50 +70 °C | -50 +70 °C | -50 +90 °C | -50 +60 °C |
| BARCOL HARDNESS (ASTM 2583) | 30 | 30 | 30 | 30 | 30 |
| STANDARD COLOUR | gray RAL 7004 | gray RAL 7004 | green translucent | natural translucent | black |
| MECHANICAL CHARACTERISTICS | | | | | |
| DENSITY | 1.900 kg/m ³ | 1.900 kg/m ³ | 1.500 kg/m ³ | 1.500 kg/m ³ | 1.900 kg/m ³ |
| MODULUS OF ELASTICITY (open mesh) | 15.000 MPa | 16.500 MPa | 12.250 MPa | 13.750 MPa | 15.000 MPa |
| ULTIMATE LIMIT TENSION (open mesh) | 325 MPa | 325 MPa | 310 MPa | 310 MPa | 325 MPa |



| | STANDARD IFR LINE | STANDARD VFR LINE | PREMIUM ISO LINE | PREMIUM VIN LINE | CONDUCTIVE FIRE RETARDANT |
|---|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| THERMAL CONDUCTIVITY K | 0,22 W/m °C | 0,22 W/m °C | 0,22 W/m °C | 0,22 W/m °C | 0,22 W/m °C |
| THERMAL EXPANSION COEFFICIENT | 1,5 10 ⁻⁵ /°C | 1,5 10 ⁻⁵ /°C | 1,5 10 ⁻⁵ /°C | 1,5 10 ⁻⁵ /°C | 1,5 10 ⁻⁵ /°C |
| ELECTRICAL CHARACTERISTICS | | | | | |
| ELECTRICAL RESISTIVITY (EN 61340-2.3 norm par. 8.1 and 8.2 with ref. to ISO 1853, IEC 60167, HD 568 S1) | excellent insulator | excellent insulator | excellent insulator | excellent insulator | - |
| ELECTRICAL CAPACITY (EN 61340-2.3 norm par. 8.1 and 8.2 - IEC 61340-4.1 Par. 5.1.2 ref. ISO 1957 - IEC 61340-4.5 - ASTM D149-97a) | - | - | - | - | excellent conductor |
| OTHER PROPERTIES | | | | | |
| REACTION TO FIRE | self-extinguishing | self-extinguishing | not determined | not determined | self-extinguishing |
| REACTION TO FIRE (ASTM E84-98) | Spread ≤ 25 | Spread ≤ 25 | | | Spread ≤ 25 |
| REACTION TO FIRE (EN 13501-1) | Level B _{fl} -S1 | Level B _{fl} -S1 | Level F _{fl} | Level F _{fl} | Level B _{fl} -S1 |

ANTISTATIC gratings (ESD_LINE) can be produced with different types of resin by means of a special finishing.

CHEMICAL RESISTANCE TEST OF NON-STRESSED THERMOSETTING RESINS

The comparative tests carried out in cooperation with the Tor Vergata University of Rome, consisting in the immersion of the samples in the substances indicated and for the time and at the temperatures specified in the Table below, show that the galvanized steel specimens suffer from widespread corrosion caused by the reactions triggered by the solutions, as opposed to the fibreglass specimens which, only in some cases, show little signs of corrosion.

| CHEMICAL AGENT | STANDARD IFR LINE Polyester resin Self-extinguishing | PREMIUM ISO LINE Isophthalic Resin | PREMIUM VIN LINE Vinylester resin | GALVANIZED METAL | | |
|---|---|---|---|---|------|------|
| Sea water H ₂ O + 4% NaCl |  |  |  |  | | |
| Colour variation | Noticeable | Noticeable | Noticeable | The sample remains essentially unchanged, except for an extensive salt deposit. | 80°C | 350h |
| Fibre exposure | Low | Low | Low | | | |
| Stress corrosion cracking | Scarce | None | None | | | |
| Salt deposits | Scarce | None | Scarce | | | |
| Surface delamination | Scarce | None | None | | | |
| Weight loss | None | None | None | | | |
| Viscous precipitates | None | None | None | | | |
| Phosphoric acid H ₂ O + 85% H ₃ PO ₄ |  |  |  |  | | |
| Colour variation | None | None | None | Immediate reaction, even before the thermal treatment, with gas and black particulate. Noticeable surface delamination. | 40°C | 150h |
| Fibre exposure | None | None | None | | | |
| Stress corrosion cracking | None | None | None | | | |
| Salt deposits | Scarce | Scarce | Scarce | | | |
| Surface delamination | None | None | None | | | |
| Weight loss | Moderate | None | None | | | |
| Viscous precipitates | None | None | None | | | |
| Hydrochloric acid H ₂ O + 20% HCl |  |  |  |  | | |
| Colour variation | Moderate | None | Noticeable | Immediate reaction with production of gas. The sample is destroyed. | 40°C | 250h |
| Fibre exposure | Scarce | Scarce | None | | | |
| Stress corrosion cracking | Scarce | None | None | | | |
| Salt deposits | Scarce | None | Noticeable | | | |
| Surface delamination | None | Moderate | None | | | |
| Weight loss | Moderate | None | None | | | |
| Viscous precipitates | None | None | None | | | |

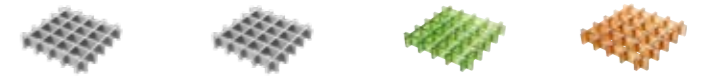
| CHEMICAL AGENT | STANDARD IFR LINE Polyester resin Self-extinguishing | PREMIUM ISO LINE Isophthalic Resin | PREMIUM VIN LINE Vinylester resin | GALVANIZED METAL | | |
|--|---|---|---|--|------|------|
| Sulphuric acid H ₂ O + 60% H ₂ SO ₄ |  |  |  |  | | |
| Colour variation | Moderate | None | None | Violent and immediate reaction with production of gas and drastic decrease of the acid solution. | 40°C | 150h |
| Fibre exposure | Moderate | Moderate | None | | | |
| Stress corrosion cracking | None | None | None | | | |
| Salt deposits | Scarce | None | None | | | |
| Surface delamination | None | None | None | | | |
| Weight loss | Very moderate | None | None | | | |
| Viscous precipitates | None | None | None | | | |
| Nitric acid H ₂ O + 35% HNO ₃ |  |  |  |  | | |
| Colour variation | Moderate | Moderate | Noticeable | Flaking of the sample with a thick salt layer on the surface. | 40°C | 250h |
| Fibre exposure | Scarce | Moderate | Scarce | | | |
| Stress corrosion cracking | Moderate | None | Scarce | | | |
| Salt deposits | Noticeable | None | Noticeable | | | |
| Surface delamination | None | None | None | | | |
| Weight loss | Moderate | Moderate | Moderate increase | | | |
| Viscous precipitates | None | None | None | | | |
| Sodium hydroxide 30% NaOH |  |  |  |  | | |
| Colour variation | Noticeable | Noticeable | Moderate | In alkaline environment, there is a loss of 2,9 g. of weight after 250 h. of treatment. | 40°C | 150h |
| Fibre exposure | Detected | Detected | Detected | | | |
| Stress corrosion cracking | Detected | Detected | Detected | | | |
| Salt deposits | Scarce | Scarce | Scarce | | | |
| Surface delamination | None | None | None | | | |
| Weight loss | Moderate | Moderate | Moderate | | | |
| Viscous precipitates | Scarce | Scarce | Scarce | | | |

CHEMICAL RESISTANCE

Table of the chemical resistance of products made with different resins in contact with a selection of chemical agents.
For further information, please contact the technical department.



| SUBSTANCE | | CONCENTRATION | STANDARD IFR LINE | STANDARD VFR LINE | PREMIUM ISO LINE | PREMIUM VIN LINE |
|---------------------------|----------------------|---------------|-------------------|-------------------|------------------|------------------|
| ACIDS | | | | | | |
| $C_2H_4O_2$ | Acetic Acid | 5% | O 30 | C 30 | C 30 | C 90 |
| | | 50% | NR | O 25 | NR | C 70 |
| C_6H_5COOH | Benzoic Acid | all | O 25 | C 40 | C 40 | C 90 |
| | | <10% | NR | NR | NR | C 80 |
| HCl | Hydrochloric Acid | 20% | NR | NR | NR | C 70 |
| | | 37% | NR | NR | NR | C 40 |
| HClO ₄ | Perchloridric Acid | 20% | NR | NR | NR | C 30 |
| H_2CrO_4 | Chromic Acid | 5% | NR | C 30 | C 30 | C 60 |
| | | 20% | NR | NR | NR | C 50 |
| HF | Hydrofluoric Acid | 10% | NR | NR | NR | O 50 |
| H_3PO_4 | Phosphoric Acid | 80% | O 30 | C 40 | C 40 | C 90 |
| HNO_3 | Nitric Acid | 5% | NR | NR | NR | C 70 |
| H_2SO_4 | Sulphuric Acid | 25% | O 20 | C 30 | C 30 | C 90 |
| BASES | | | | | | |
| Al(OH) ₃ | Aluminium Hydroxide | all | NR | NR | NR | C 70 |
| NH ₄ OH | Ammonium Hydroxide | 28% | NR | NR | NR | C 40 |
| | | 5% | O 20 | O 20 | O 20 | C 60 |
| NaOH | Sodium Hydroxide | 25% | O 20 | O 20 | O 20 | C 60 |
| | | 50% | NR | NR | NR | C 60 |
| SALTS | | | | | | |
| NH_4HCO_3 | Ammonium Bicarbonate | all | NR | NR | NR | C 60 |
| NH_4Cl | Ammonium Chloride | all | O 40 | C 40 | C 40 | C 80 |
| $(NH_4)_2SO_4$ | Ammonium Sulphate | all | O 40 | C 40 | C 40 | C 80 |
| $CaCl_2$ | Calcium Chloride | all | O 30 | C 40 | C 40 | C 80 |
| $Ca(NO_3)_2$ | Calcium Nitrate | all | O 30 | C 40 | C 40 | C 80 |
| $FeCl_3$ | Ferric Chloride | all | O 25 | C 30 | C 30 | C 80 |
| $FeCl_2$ | Ferrous Chloride | all | O 30 | C 30 | C 30 | C 80 |
| LiCl | Lithium Chloride | all | O 30 | C 40 | C 40 | C 80 |
| $MgCl_2$ | Magnesium Chloride | all | O 30 | C 40 | C 40 | C 80 |
| $Mg(NO_3)_2$ | Magnesium Nitrate | all | O 30 | C 40 | C 40 | C 80 |
| $MnSO_4$ | Manganese Sulphate | all | O 30 | C 40 | C 40 | C 80 |
| KNO_3 | Potassium Nitrate | all | O 30 | C 40 | C 40 | C 80 |
| KCl | Potassium Chloride | all | O 30 | C 40 | C 40 | C 80 |
| K_2SO_4 | Potassium Sulphate | all | O 30 | C 40 | C 40 | C 80 |
| $CuCN$ | Copper Cyanide | all | NR | NR | NR | C 80 |
| $CuCl_2$ | Copper Chloride | all | O 30 | C 30 | C 30 | C 80 |
| $Cu(NO_3)_2$ | Copper Nitrate | all | O 30 | C 30 | C 30 | C 80 |
| $Na_2B_4O_7 \cdot 10H_2O$ | Sodium Borate | all | O 30 | C 30 | C 30 | C 80 |
| NaCN | Sodium Cyanide | 15% | NR | NR | NR | C 60 |
| $ZnSO_4$ | Zinc Sulphate | all | O 30 | C 30 | C 30 | C 80 |



| SUBSTANCE | | CONCENTRATION | STANDARD IFR LINE | STANDARD VFR LINE | PREMIUM ISO LINE | PREMIUM VIN LINE | |
|--------------------------|------------------------|----------------------------------|-------------------|-------------------|------------------|------------------|------|
| ALCOHOL | | | | | | | |
| C_2H_6O | Ethanol | 10% | O 20 | C 30 | C 30 | C 50 | |
| | | 5% | NR | NR | NR | C 30 | |
| CH_3OH | Methanol | 5% | NR | NR | NR | C 30 | |
| SOLVENTS | | | | | | | |
| C_6H_6 | Benzene | 100% | NR | NR | NR | NR | |
| | | No lead, no methanol Gasoline | 100% | O 25 | O 25 | O 25 | C 40 |
| | | Acetone | 5% | NR | NR | NR | C 70 |
| ORGANIC COMPOUNDS | | | | | | | |
| $C_2H_6O_2$ | Ethylene Glycol | 100% | O 20 | C 30 | C 30 | C 80 | |
| $C_6H_{12}O_6$ | Glucose | all | O 20 | C 30 | C 30 | C 80 | |
| $C_3H_8O_3$ | Glycerol | 100% | O 20 | C 30 | C 30 | C 80 | |
| | | 10% | O 20 | C 30 | C 30 | C 80 | |
| $C_3H_6O_3$ | Lactic Acid | 80% | NR | O 20 | O 20 | C 80 | |
| | | 50% | O 20 | C 30 | C 30 | C 80 | |
| $C_6H_8O_7$ | Citric Acid | 100% | NR | NR | NR | C 80 | |
| | | 50% | O 20 | C 30 | C 30 | C 80 | |
| - | Vinegar | all | O 20 | C 20 | C 20 | C 80 | |
| WHITENING AGENTS | | | | | | | |
| H_2O_2 | Hydrogen Peroxide | 5% | NR | NR | NR | C 60 | |
| GAS AND FUMES | | | | | | | |
| Cl_2 | Dry chlorine gas | 100% | NR | NR | NR | C 40 | |
| | | Wet chlorine gas | 100% | NR | NR | NR | C 40 |
| H_2S | Hydrogen Sulphide, gas | 5% | O 20 | O 30 | O 30 | C 70 | |
| | | 100% | NR | NR | NR | C 70 | |
| OTHER | | | | | | | |
| CH_2O | Formaldehyde | 50% | NR | NR | NR | C 40 | |
| | | Urea | all | O 20 | C 30 | C 30 | C 50 |
| - | Seawater | 100% | O 30 | C 40 | C 40 | C 80 | |

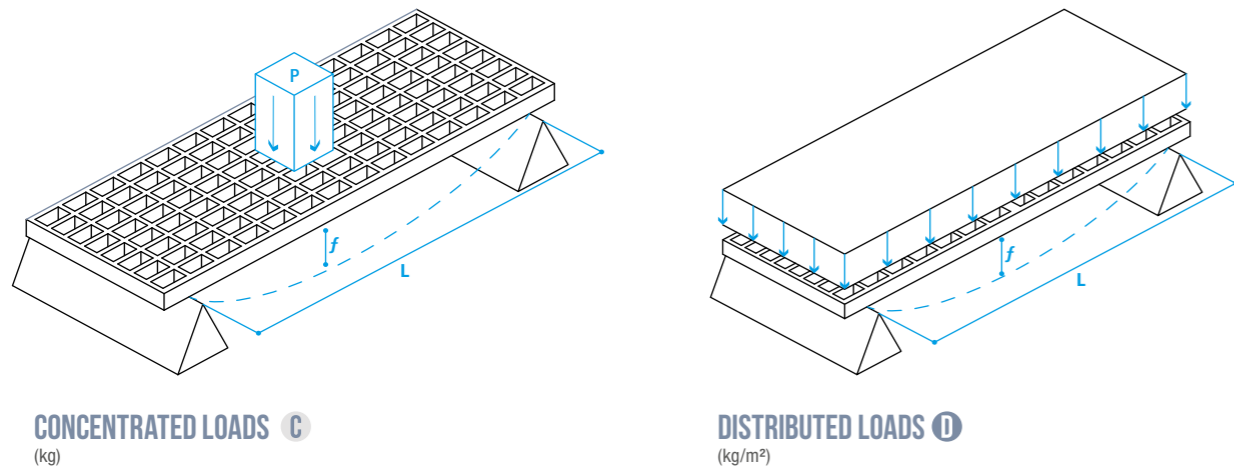
C - continuous exposure of the gratings to the chemical environment at the specified temperatures
O - occasional exposure of the gratings to the chemical environment at the specified temperatures
NR - Not recommended

The information and recommendations shown above are given in good faith and based on our best knowledge.
The Chemical Resistance Table is to be considered as a general guide and not as a guarantee.
For specific applications it is advisable to test the products that we provide in order to ascertain if they are suitable for the applications for which they are intended.
We cannot monitor the conditions of use or how the products are employed.

LOAD TABLES BY GRATING TYPE

The following tables show how the loads that vary according to the distance between the supports (L), generating in the grating a deflection of 1/200 of the distance itself (e.g. with distance between the supports (L) 600 mm, load deflection indicated (f) 3 mm).

The figures refer to evenly distributed loads and to concentrated loads on a 200 x 200 mm footprint with the gratings simply resting on both ends.

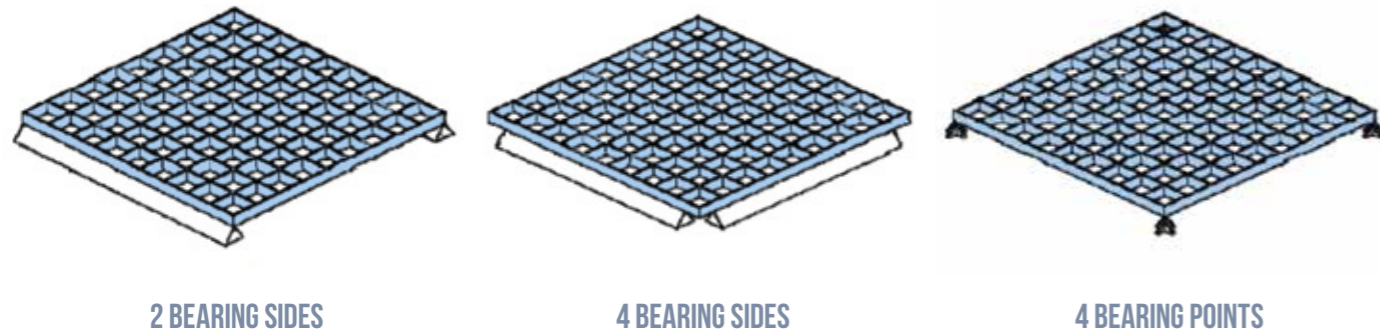


TYPES OF SUPPORT FOR GRATINGS

The drawings below show which could be the types of supports. The gratings support width must be at least 2/3 of the height of the piece itself.

The stated data in the tables refer to grating placed on two supports.

When using square mesh gratings that are load-bearing in both directions, the four support sides increase the mechanical performance.



STANDARD IFR/CFR LINE GRATINGS LOAD-DEFORMATION

| TYPE OF GRATING | L (mm) f (mm) | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1.000 | 1.100 | 1.200 | 1.300 | 1.400 | |
|------------------|---------------------|---------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|-------|--|
| | | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 | 6,5 | 7 | |
| SQUARE MESH | SCH38/15 | C kg | 58,5 | 38 | 28,7 | | | | | | | | | |
| | | D kg/m ² | 940 | 395 | 203 | | | | | | | | | |
| | SCH38/25 | C kg | 269 | 175 | 131 | 105 | 88 | 75 | 66 | | | | | |
| | | D kg/m ² | 4.350 | 1.835 | 935 | 543 | 342 | 230 | 160 | | | | | |
| | SCH38/30 | C kg | | | 227 | 182 | 152 | 131 | 114 | 102 | 92 | | | |
| | | D kg/m ² | | | 1.620 | 940 | 590 | 395 | 278 | 202 | 152 | | | |
| SCH38/38 | C kg | | | 460 | 370 | 308 | 265 | 230 | 205 | 185 | | | | |
| | D kg/m ² | | | 3.300 | 1.900 | 1.190 | 800 | 560 | 410 | 300 | | | | |
| SCH38/60 | C kg | | | | | 2.150 | 1.820 | 1.580 | 1.400 | 1.200 | 1.050 | 910 | | |
| | D kg/m ² | | | | | 7.900 | 5.400 | 3.700 | 2.700 | 2.050 | 1.560 | 1.240 | | |
| SCH50/50 | C kg | | | | | 573 | 492 | 433 | 387 | 345 | 315 | 291 | | |
| | D kg/m ² | | | | | 2.230 | 1.500 | 1.050 | 765 | 575 | 440 | 345 | | |
| RECTANGULAR MESH | SCH30/28 | C kg | | | 242 | 190 | 158 | 135 | 119 | 105 | 95 | | | |
| | | D kg/m ² | | | 2.100 | 1.200 | 765 | 515 | 360 | 262 | 197 | | | |
| MINI MESH | SCH13/30 | C kg | | | 293 | 235 | 195 | 165 | 148 | 133 | 118 | | | |
| | | D kg/m ² | | | 2.100 | 1.200 | 760 | 510 | 355 | 260 | 195 | | | |
| | SCH13/38 | C kg | | | 630 | 500 | 410 | 350 | 305 | 265 | 230 | | | |
| | | D kg/m ² | | | 4.200 | 2.500 | 1.500 | 1.030 | 720 | 520 | 395 | | | |
| | SCH52/30 | C kg | | | 225 | 180 | 151 | 130 | 114 | 102 | 92 | | | |
| | | D kg/m ² | | | 1.610 | 920 | 585 | 395 | 275 | 200 | 150 | | | |
| SCH52/40 | C kg | | | 530 | 425 | 355 | 305 | 265 | 240 | 215 | | | | |
| | D kg/m ² | | | 3.770 | 2.175 | 1.375 | 920 | 650 | 475 | 355 | | | | |
| SCH52/52 | C kg | | | | 1.100 | 930 | 800 | 700 | 625 | 570 | 520 | 475 | | |
| | D kg/m ² | | | | 5.800 | 3.650 | 2.450 | 1.700 | 1.250 | 940 | 720 | 570 | | |
| SCH52/100 | C kg | | | | | 6.200 | 5.400 | 4.850 | 4.350 | 3.950 | 3.650 | 3.400 | | |
| | D kg/m ² | | | | | 18.700 | 13.100 | 9.550 | 7.200 | 5.500 | 4.350 | 3.500 | | |
| MICRO MESH | SCH12/30 | C kg | | | 330 | 265 | 220 | 190 | 168 | 150 | 135 | | | |
| | | D kg/m ² | | | 2.350 | 1.350 | 860 | 580 | 405 | 295 | 220 | | | |
| SCH12/38 | C kg | | | 700 | 550 | 470 | 400 | 340 | 300 | 260 | | | | |
| | D kg/m ² | | | 4.800 | 2.700 | 1.700 | 1.150 | 800 | 600 | 450 | | | | |
| COVERED | SCH38/17C | C kg | 233 | 153 | 116 | 93 | 78 | 67 | 59 | | | | | |
| | | D kg/m ² | 3.150 | 1.300 | 680 | 395 | 250 | 165 | 117 | | | | | |
| | SCH38/25C | C kg | 395 | 300 | 240 | 201 | 174 | 152 | 135 | 123 | | | | |
| | | D kg/m ² | 3.550 | 1.830 | 1.050 | 665 | 445 | 310 | 225 | 171 | | | | |
| | SCH38/30C | C kg | 620 | 470 | 380 | 315 | 275 | 240 | 215 | 194 | | | | |
| | | D kg/m ² | 5.700 | 2.900 | 1.700 | 1.050 | 710 | 500 | 360 | 275 | | | | |
| SCH38/38C | C kg | 1.150 | 850 | 680 | 580 | 500 | 440 | 390 | 355 | | | | | |
| | D kg/m ² | 10.500 | 5.400 | 3.100 | 1.950 | 1.300 | 930 | 680 | 510 | | | | | |
| SCH50/50C | C kg | | | | 1.020 | 880 | 770 | 690 | 620 | 565 | 520 | | | |
| | D kg/m ² | | | | 3.500 | 2.350 | 1.650 | 1.200 | 900 | 690 | 545 | | | |
| SCH52/52C | C kg | | | | 1.390 | 1.200 | 1.050 | 940 | 850 | 770 | 710 | | | |
| | D kg/m ² | | | | 4.900 | 3.250 | 2.300 | 1.650 | 1.260 | 970 | 765 | | | |
| SCH52/100C | C kg | | | | | 7.800 | 6.900 | 6.150 | 5.550 | 5.050 | 4.650 | 4.300 | | |
| | D kg/m ² | | | | | 22.300 | 15.700 | 11.500 | 8.600 | 6.600 | 5.200 | 4.150 | | |
| DOUBLE COVERED | SCH38/17DC | C kg | 670 | 450 | 340 | 275 | 231 | 200 | 175 | | | | | |
| | | D kg/m ² | 8.900 | 3.750 | 1.930 | 1.100 | 700 | 470 | 330 | | | | | |
| | SCH38/25DC | C kg | 1.430 | 950 | 720 | 580 | 485 | 420 | 370 | | | | | |
| | | D kg/m ² | 19.400 | 8.200 | 4.150 | 2.400 | 1.500 | 1.020 | 710 | | | | | |
| | SCH38/30DC | C kg | | | 1.050 | 840 | 710 | 610 | 530 | 480 | 435 | | | |
| | | D kg/m ² | | | 6.100 | 3.500 | 2.230 | 1.500 | 1.050 | 770 | 575 | | | |
| SCH38/38DC | C kg | | | 1.730 | 1.400 | 1.170 | 1.010 | 890 | 790 | 715 | | | | |
| | D kg/m ² | | | 10.350 | 6.000 | 3.750 | 2.500 | 1.770 | 1.280 | 970 | | | | |
| SCH50/50DC | C kg | | | | 2.025 | 1.750 | 1.535 | 1.370 | 1.240 | 1.130 | 1.040 | | | |
| | D kg/m ² | | | | 6.500 | 4.350 | 3.050 | 2.250 | 1.680 | 1.300 | 1.020 | | | |
| SCH52/52DC | C kg | | | | 2.530 | 2.150 | 1.920 | 1.710 | 1.550 | 1.400 | 1.300 | | | |
| | D kg/m ² | | | | 8.350 | 5.600 | 3.930 | 2.880 | 2.160 | 1.650 | 1.300 | | | |
| SCH52/100DC | C kg | | | | | 11.100 | 9.700 | 8.700 | 7.800 | 7.150 | 6.550 | 6.100 | | |
| | D kg/m ² | | | | | 30.000 | 21.000 | 15.300 | 11.500 | 8.900 | 6.950 | 5.600 | | |

C Concentrated load D Distributed load

STANDARD VFR LINE GRATINGS LOAD-DEFORMATION

| TYPE OF GRATING | L (mm) f (mm) | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1.000 | 1.100 | 1.200 | 1.300 | 1.400 |
|------------------|------------------|---------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|-------|
| | | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 | 6,5 | 7 |
| SQUARE MESH | SCH38/15 | C kg | 64 | 42 | 31 | | | | | | | | |
| | | D kg/m² | 1.030 | 430 | 220 | | | | | | | | |
| | SCH38/25 | C kg | 295 | 190 | 145 | 115 | 97 | 83 | 73 | | | | |
| | | D kg/m² | 4.750 | 2.000 | 1.030 | 590 | 375 | 250 | 175 | | | | |
| | SCH38/30 | C kg | | | 250 | 200 | 165 | 145 | 125 | 110 | 100 | | |
| | | D kg/m² | | | 1.750 | 1.020 | 650 | 430 | 305 | 220 | 165 | | |
| RECTANGULAR MESH | SCH38/38 | C kg | | 505 | 400 | 340 | 290 | 255 | 230 | 205 | | | |
| | | D kg/m² | | 3.600 | 2.100 | 1.320 | 880 | 620 | 450 | 310 | | | |
| | SCH38/60 | C kg | | | | 2.350 | 2.000 | 1.750 | 1.500 | 1.320 | 1.150 | 1.000 | |
| | | D kg/m² | | | | 8.800 | 5.800 | 4.100 | 3.000 | 2.250 | 1.750 | 1.370 | |
| | SCH50/50 | C kg | | | | 630 | 540 | 475 | 425 | 383 | 350 | 320 | |
| | | D kg/m² | | | | 2.450 | 1.650 | 1.150 | 840 | 630 | 485 | 383 | |
| MINI MESH | SCH30/28 | C kg | | 265 | 210 | 173 | 150 | 130 | 116 | 104 | | | |
| | | D kg/m² | | 2.300 | 1.330 | 845 | 565 | 395 | 290 | 215 | | | |
| | SCH13/30 | C kg | | 320 | 258 | 215 | 185 | 160 | 145 | 131 | | | |
| | | D kg/m² | | 2.300 | 1.330 | 840 | 565 | 395 | 288 | 215 | | | |
| | SCH13/38 | C kg | | 700 | 550 | 450 | 390 | 335 | 290 | 250 | | | |
| | | D kg/m² | | 4.650 | 2.680 | 1.690 | 1.140 | 790 | 580 | 430 | | | |
| MICRO MESH | SCH52/30 | C kg | | 247 | 195 | 165 | 140 | 125 | 112 | 101 | | | |
| | | D kg/m² | | 1.770 | 1.030 | 645 | 430 | 300 | 220 | 165 | | | |
| | SCH52/40 | C kg | | 580 | 465 | 390 | 335 | 290 | 260 | 235 | | | |
| | | D kg/m² | | 4.150 | 2.400 | 1.500 | 1.020 | 710 | 520 | 390 | | | |
| | SCH52/52 | C kg | | | 1.230 | 1.030 | 880 | 775 | 695 | 625 | 570 | 525 | |
| | | D kg/m² | | | 6.350 | 4.000 | 2.650 | 1.880 | 1.380 | 1.030 | 800 | 625 | |
| COVERED | SCH52/100 | C kg | | | | 6.800 | 5.950 | 5.300 | 4.800 | 4.350 | 4.000 | 3.750 | |
| | | D kg/m² | | | | 20.500 | 14.500 | 10.500 | 7.900 | 6.100 | 4.800 | 3.850 | |
| | SCH12/30 | C kg | | 365 | 290 | 245 | 210 | 185 | 165 | 148 | | | |
| | | D kg/m² | | 2.600 | 1.500 | 950 | 640 | 445 | 325 | 245 | | | |
| | SCH12/38 | C kg | | 790 | 620 | 515 | 440 | 380 | 330 | 290 | | | |
| | | D kg/m² | | 5.250 | 3.000 | 1.920 | 1.290 | 900 | 650 | 490 | | | |
| DOUBLE COVERED | SCH38/17C | C kg | 245 | 163 | 123 | 98 | 83 | 71 | 62 | | | | |
| | | D kg/m² | 3.350 | 1.430 | 730 | 420 | 265 | 175 | 125 | | | | |
| | SCH38/25C | C kg | | 420 | 315 | 250 | 210 | 183 | 160 | 142 | 130 | | |
| | | D kg/m² | | 3.800 | 1.950 | 1.130 | 710 | 475 | 330 | 240 | 180 | | |
| | SCH38/30C | C kg | | 650 | 500 | 400 | 335 | 290 | 255 | 225 | 205 | | |
| | | D kg/m² | | 6.100 | 3.100 | 1.800 | 1.140 | 760 | 535 | 390 | 290 | | |
| COVERED | SCH38/38C | C kg | | 1.220 | 920 | 740 | 610 | 530 | 465 | 415 | 370 | | |
| | | D kg/m² | | 11.300 | 5.850 | 3.350 | 2.100 | 1.420 | 1.000 | 730 | 540 | | |
| | SCH50/50C | C kg | | | | 1.080 | 930 | 820 | 735 | 660 | 600 | 555 | |
| | | D kg/m² | | | | 3.750 | 2.500 | 1.750 | 1.275 | 970 | 740 | 580 | |
| | SCH52/52C | C kg | | | | 1.490 | 1.290 | 1.130 | 1.000 | 910 | 820 | 760 | |
| | | D kg/m² | | | | 5.300 | 3.500 | 2.490 | 1.800 | 1.350 | 1.050 | 825 | |
| DOUBLE COVERED | SCH52/100C | C kg | | | | 8.500 | 7.400 | 6.600 | 6.000 | 5.400 | 5.000 | 4.650 | |
| | | D kg/m² | | | | 24.300 | 17.000 | 12.200 | 9.300 | 7.200 | 5.650 | 4.550 | |
| | SCH38/17DC | C kg | 680 | 455 | 345 | 280 | 234 | 202 | 178 | | | | |
| | | D kg/m² | 9.100 | 3.850 | 1.970 | 1.130 | 710 | 480 | 335 | | | | |
| | SCH38/25DC | C kg | 1.460 | 970 | 735 | 595 | 495 | 430 | 378 | | | | |
| | | D kg/m² | 19.900 | 8.400 | 4.250 | 2.480 | 1.560 | 1.050 | 735 | | | | |
| DOUBLE COVERED | SCH38/30DC | C kg | | 1.070 | 865 | 725 | 628 | 550 | 490 | 444 | | | |
| | | D kg/m² | | 6.300 | 3.670 | 2.300 | 1.550 | 1.080 | 790 | 590 | | | |
| | SCH38/38DC | C kg | | 1.780 | 1.440 | 1.200 | 1.040 | 910 | 820 | 738 | | | |
| | | D kg/m² | | 10.700 | 6.200 | 3.900 | 2.610 | 1.830 | 1.340 | 1.000 | | | |
| | SCH50/50DC | C kg | | | | 2.080 | 1.790 | 1.580 | 1.410 | 1.275 | 1.160 | 1.070 | |
| | | D kg/m² | | | | 6.750 | 4.550 | 3.170 | 2.330 | 1.740 | 1.340 | 1.055 | |
| DOUBLE COVERED | SCH52/52DC | C kg | | | | 2.640 | 2.280 | 1.990 | 1.790 | 1.610 | 1.470 | 1.350 | |
| | | D kg/m² | | | | 8.750 | 5.850 | 4.100 | 3.010 | 2.250 | 1.740 | 1.360 | |
| | SCH52/100DC | C kg | | | | 11.700 | 10.250 | 9.200 | 8.300 | 7.500 | 6.950 | 6.450 | |
| | | D kg/m² | | | | 31.800 | 22.300 | 16.300 | 12.250 | 9.400 | 7.400 | 5.900 | |

C Concentrated load D Distributed load

PREMIUM ISO LINE GRATINGS LOAD-DEFORMATION

| TYPE OF GRATING | L (mm) f (mm) | 500 | 600 | 700 | 800 | 900 | 1.000 | 1.100 | 1.200 | 1.300 | 1.400 | |
|------------------|------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| | | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 | 6,5 | 7 | |
| SQUARE MESH | SCH38/38 | C kg | 385 | 305 | 255 | 220 | 190 | 174 | 156 | | | |
| | | D kg/m² | 2.750 | 1.550 | 1.000 | 670 | 470 | 340 | 255 | | | |
| | SCH40/30 | C kg | 180 | 144 | 120 | 103 | 90 | 80 | 73 | | | |
| | | D kg/m² | 1.275 | 745 | 465 | 310 | 220 | 160 | 120 | | | |
| | SCH40/38 | C kg | 460 | 370 | 305 | 265 | 233 | 205 | 185 | | | |
| | | D kg/m² | 3.250 | 1.900 | 1.200 | 800 | 560 | 410 | 305 | | | |
| RECTANGULAR MESH | SCH50/50_HDL | C kg | | | 560 | 480 | 420 | 380 | 340 | 310 | 285 | |
| | | D kg/m² | | | 2.150 | 1.450 | 1.020 | 750 | 560 | 430 | 340 | |
| | SCH30/28 | C kg | 200 | 160 | 132 | 112 | 98 | 88 | 79 | | | |
| | | D kg/m² | 1.750 | 1.000 | 640 | 425 | 300 | 220 | 165 | | | |
| | SCH30/38 | C kg | 500 | 395 | 325 | 280 | 245 | 215 | 195 | | | |
| | | D kg/m² | 4.370 | 2.500 | 1.600 | 1.050 | 750 | 550 | 410 | | | |
| MINI MESH | SCH50/28 | C kg | 225 | 183 | 150 | 130 | 110 | 102 | 91 | | | |
| | | D kg/m² | 1.750 | 1.000 | 635 | 420 | 300 | 220 | 163 | | | |
| | SCH68/50 | C kg | | | 385 | 330 | 290 | 260 | 235 | 210 | 195 | 180 |
| | | D kg/m² | | | 1.600 | 1.050 | 750 | 550 | 410 | 315 | 250 | 200 |
| | SCH52/30 | C kg | 187 | 150 | 125 | 108 | 95 | 85 | 76 | | | |
| | | D kg/m² | 1.330 | 780 | 490 | 320 | 230 | 167 | 125 | | | |
| COVERED | SCH52/40 | C kg | 440 | 350 | 295 | 255 | 220 | 200 | 180 | | | |
| | | D kg/m² | 3.150 | 1.800 | 1.150 | 760 | 540 | 390 | 295 | | | |
| | SCH30/28C | C kg | 730 | 580 | 485 | 420 | 365 | 325 | 295 | | | |
| | | D kg/m² | 4.600 | 2.700 | 1.700 | 1.150 | 800 | 580 | 435 | | | |
| | SCH30/38C | C kg | 1.450 | 1.150 | 980 | 850 | 740 | 660 | 590 | | | |
| | | D kg/m² | 9.500 | 5.600 | 3.500 | 2.350 | 1.650 | 1.200 | 900 | | | |
| COVERED | SCH40/30C | C kg | 530 | 430 | 360 | 310 | 270 | 242 | 220 | | | |
| | | D kg/m² | 3.100 | 1.750 | 1.130 | 750 | 530 | 385 | 290 | | | |
| | SCH40/38C | C kg | 1.290 | 1.040 | 870 | 750 | 660 | 590 | 530 | | | |
| | | D kg/m² | 7.800 | 4.500 | 2.850 | 1.900 | 1.330 | 980 | 730 | | | |
| | SCH50/50C_HDL | C kg | | | 900 | 780 | 680 | 610 | 550 | 505 | 460 | |
| | | D kg/m² | | | 3.050 | 2.050 | 1.430 | 1.050 | 790 | 600 | 475 | |

C Concentrated load D Distributed load

PREMIUM VIN LINE GRATINGS LOAD-DEFORMATION

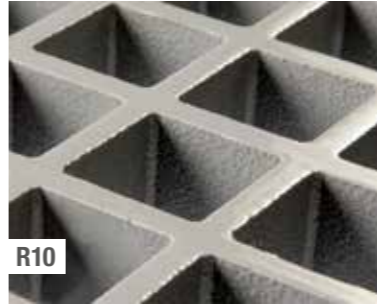



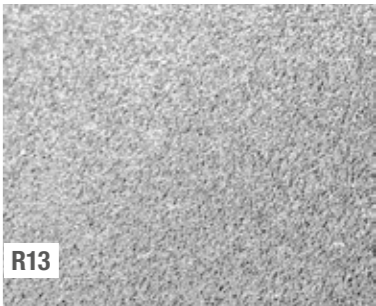

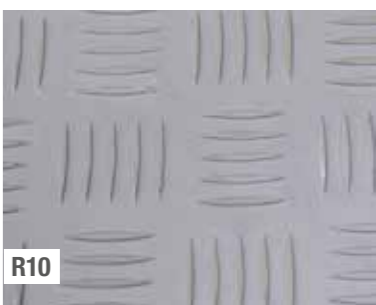


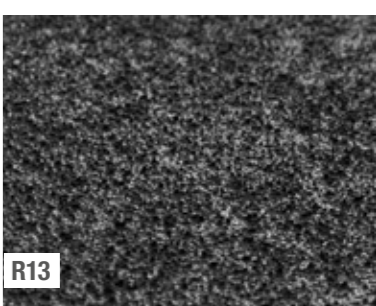
| TYPE OF GRATING | | L (mm) | 500 | 600 | 700 | 800 | 900 | 1.000 | 1.100 | 1.200 | 1.300 | 1.400 | |
|------------------|---------------------|---------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| | | f (mm) | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 | 6,5 | 7 | |
| SQUARE MESH | SCH38/38 | C kg | 420 | 340 | 280 | 240 | 210 | 190 | 170 | | | | |
| | | D kg/m ² | 3.000 | 1.750 | 1.100 | 740 | 510 | 375 | 280 | | | | |
| | SCH40/30 | C kg | 195 | 155 | 130 | 115 | 100 | 90 | 80 | | | | |
| | | D kg/m ² | 1.400 | 820 | 515 | 345 | 240 | 175 | 130 | | | | |
| | SCH40/38 | C kg | 500 | 410 | 335 | 290 | 255 | 225 | 205 | | | | |
| | | D kg/m ² | 3.600 | 2.100 | 1.300 | 880 | 620 | 450 | 335 | | | | |
| SCH50/50_HDL | C kg | | | 610 | 535 | 460 | 410 | 375 | 340 | 310 | | | |
| | D kg/m ² | | | 2.400 | 1.600 | 1.130 | 820 | 610 | 470 | 370 | | | |
| RECTANGULAR MESH | SCH30/28 | C kg | 220 | 175 | 145 | 125 | 108 | 97 | 87 | | | | |
| | | D kg/m ² | 1.930 | 1.100 | 700 | 470 | 330 | 240 | 180 | | | | |
| | SCH30/38 | C kg | 550 | 430 | 360 | 310 | 270 | 240 | 215 | | | | |
| | | D kg/m ² | 4.800 | 2.800 | 1.750 | 1.150 | 825 | 600 | 450 | | | | |
| | SCH50/28 | C kg | 250 | 200 | 165 | 142 | 125 | 110 | 100 | | | | |
| | | D kg/m ² | 1.900 | 1.100 | 700 | 470 | 330 | 240 | 180 | | | | |
| SCH68/50 | C kg | | | 425 | 360 | 320 | 285 | 255 | 235 | 215 | 200 | | |
| | D kg/m ² | | | 1.750 | 1.175 | 830 | 600 | 455 | 350 | 275 | 220 | | |
| MINI MESH | SCH52/30 | C kg | 205 | 165 | 138 | 115 | 103 | 93 | 83 | | | | |
| | | D kg/m ² | 1.450 | 850 | 530 | 360 | 250 | 185 | 135 | | | | |
| | SCH52/40 | C kg | 480 | 390 | 325 | 280 | 245 | 220 | 197 | | | | |
| | | D kg/m ² | 3.450 | 2.000 | 1.250 | 840 | 590 | 435 | 325 | | | | |
| COVERED | SCH30/28C | C kg | 770 | 610 | 515 | 440 | 385 | 345 | 310 | | | | |
| | | D kg/m ² | 4.950 | 2.850 | 1.800 | 1.200 | 850 | 620 | 465 | | | | |
| | SCH30/38C | C kg | 1.550 | 1.250 | 1.040 | 890 | 780 | 700 | 630 | | | | |
| | | D kg/m ² | 10.300 | 5.900 | 3.750 | 2.500 | 1.750 | 1.250 | 960 | | | | |
| | SCH40/30C | C kg | 560 | 455 | 380 | 330 | 285 | 255 | 230 | | | | |
| | | D kg/m ² | 3.300 | 1.900 | 1.200 | 810 | 565 | 415 | 310 | | | | |
| SCH40/38C | C kg | 1.350 | 1.100 | 920 | 790 | 690 | 625 | 560 | | | | | |
| | D kg/m ² | 8.400 | 4.850 | 3.050 | 2.050 | 1.430 | 1.050 | 780 | | | | | |
| SCH50/50C_HDL | C kg | | | 960 | 830 | 730 | 650 | 585 | 535 | 490 | | | |
| | D kg/m ² | | | 3.250 | 2.200 | 1.550 | 1.120 | 840 | 650 | 510 | | | |

- The above mentioned characteristics must be understood as reference values for standard material in ambient temperature. Even though they should not be taken as guaranteed characteristics, they are based on our experience and provided in good faith.
- In accordance with the DIN 24537-3 standard, the safety conversion factor should be 0,75 for internal exposure conditions, 0,65 for external exposure conditions, and 0,50 for aggressive exposure conditions.
- Regardless of the type of exposure conditions, chemical resistance must always be verified by contacting M.M. technical department.
- In cases of heavy loads and narrow span, the compressive strength must always be verified.

C Concentrated load D Distributed load

FINISHINGS

Gratings can be supplied with a variety of finishings that provide non-slip characteristics in accordance with DIN 51130 / DIN 51097 standards and surface electrical conductivity.

| | | | |
|--|---|---|---|
| | SMOOTH | MENISCUS | COVERED SURFACE |
| WITHOUT QUARTZ |  |  | |
| DIN 51130 Antiskid | R10 | R13 | |
| WITH QUARTZ |  |  |  |
| DIN 51130 Antiskid | R13 | R13 | R13 |
| Q-PAINT |  | |  |
| UNI EN 13451-1 (swimming pool equipment) class 24 | CLASS C | | CLASS C |
| DIN 51097 Suitable for bare feet | | | |
| CHECKERED SURFACE | | |  |
| DIN 51130 Antiskid | | | R10 |
| ESD LINE SURFACE ELECTRICAL CONDUCTIVITY |  |  |  |
| DIN 51130 Antiskid | R13 | R13 | R13 |

02

STANDARD LINE

MM
IFR / VFR



The standard line gratings are made of polyester or vinylester resin, fibreglass and inorganic halogen-free fillers that provide the self-extinguishing properties.

They are supplied with different **non-slip** level surfaces, classified and certified according to the DIN 51130 standard (determination of the non-slip properties), as shown in the finishings table (page 15).

Gratings are certified as long lasting products whose mechanical performance is not affected by the cycles of hot/cold and humidity exposure in accordance with the UNI EN ISO 9142 standard; they have also passed the aging resistance test with cycles of UV exposure in accordance with the ASTM G154 standard; they are supplied with self-extinguishing properties in accordance with EN13501, ASTM E84, ASTM D635, DIN 4102, NFP 92-507 standards.

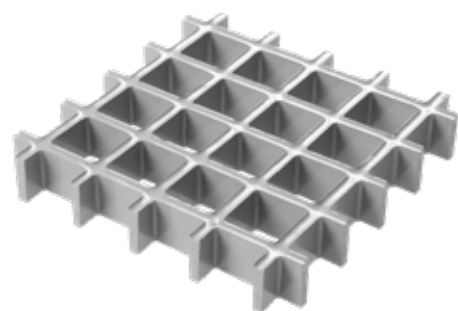
They are tested and classified as **excellent electrical insulators**.

DIELECTRIC

SELF-EXTINGUISHING

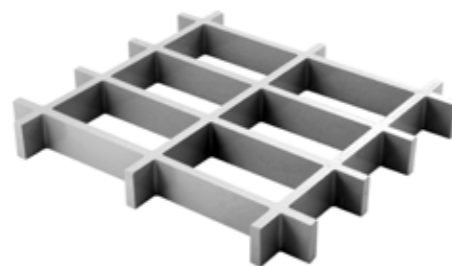
RESISTANT TO ATMOSPHERIC AGENTS

MESHES



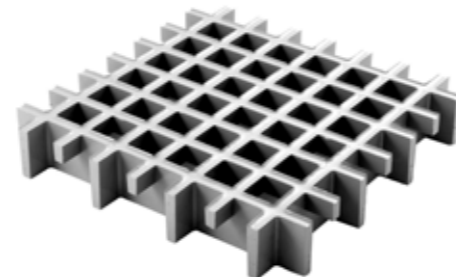
SQUARE MESH

It is characterized by the same bearing capacity in both directions, it stands out for its versatility of use and capacity to support heavy loads.



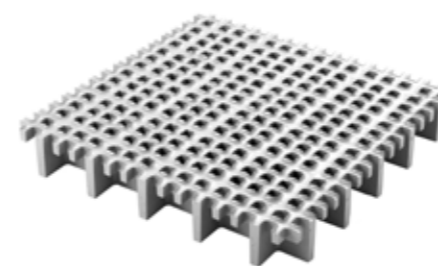
RECTANGULAR MESH

It is ideal for the construction of industrial and residential fences.



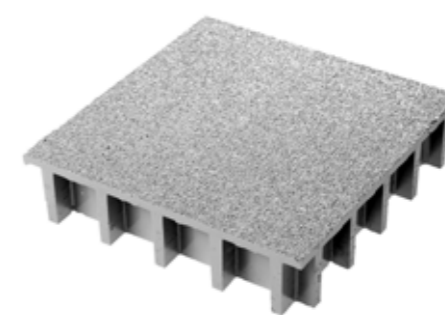
MINI MESH

With safety mesh suitable for raised walkways in compliance with current safety regulations.



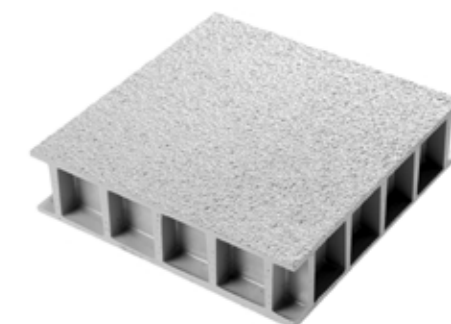
MICRO MESH

"Heelproof" mesh.



COVERED

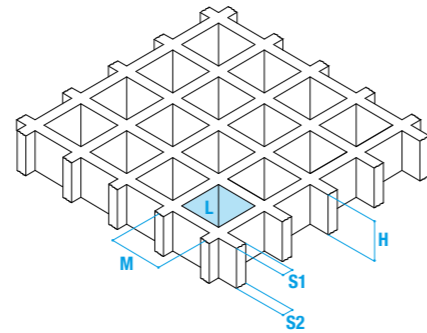
Used mainly for covering pipes, tanks or areas where there is the need to prevent objects or dust from falling or the release of vapours. Ideal for covering cable ducts.



DOUBLE COVERED

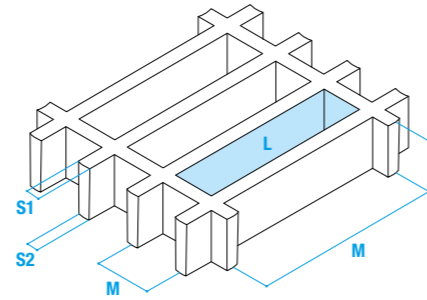
SQUARE MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|----------|----------|-------|-------|------|--|-------------------|
| SCH38/15 | 38x38 mm | 31x31 mm | 15 mm | 7 mm | 5 mm | 1.220x3.660 mm | 5,0 |
| SCH38/25 | 38x38 mm | 31x31 mm | 25 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm | 11,0 |
| SCH38/30 | 38x38 mm | 31x31 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm | 15,0 |
| SCH38/38 | 38x38 mm | 31x31 mm | 38 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm 1.220x4.038 mm 1.528x4.038 mm | 18,0 |
| SCH38/60 | 38x38 mm | 27x27 mm | 60 mm | 11 mm | 9 mm | 1.240x3.660 mm | 62,0 |
| SCH50/50 | 50x50 mm | 42x42 mm | 50 mm | 8 mm | 5 mm | 1.220x3.660 mm | 19,5 |



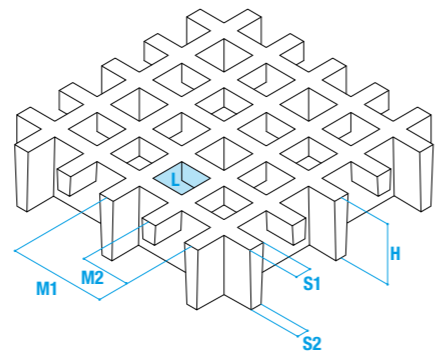
RECTANGULAR MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|-----------|----------|-------|------|------|----------------------------------|-------------------|
| SCH30/28 | 100x30 mm | 92x22 mm | 28 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.500x2.000 mm | 13,0 |
| SCH60/25 | 100x60 mm | 93x53 mm | 25 mm | 7 mm | 5 mm | 1.500x2.000 mm | 7,0 |
| SCH60/28 | 100x60 mm | 92x52 mm | 28 mm | 8 mm | 7 mm | 1.500x2.000 mm | 9,0 |



MINI MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|-----------|----------|----------|----------|--------|-------|------|--|-------------------|
| SCH52/30 | 52x52 mm | 26x26 mm | 19x19 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm 1.220x3.660 mm 1.500x2.000 mm | 15,0 |
| SCH52/40 | 52x52 mm | 26x26 mm | 19x19 mm | 40 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm 1.500x2.000 mm | 21,0 |
| SCH52/52 | 52x52 mm | 26x26 mm | 19x19 mm | 52 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm | 26,5 |
| SCH52/100 | 52x52 mm | 26x26 mm | 19x19 mm | 100 mm | 10 mm | 8 mm | 1.010x1.495 mm | 56,0 |
| SCH13/30 | 40x40 mm | 20x20 mm | 13x13 mm | 30 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 19,0 |
| SCH13/38 | 40x40 mm | 20x20 mm | 13x13 mm | 38 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 23,5 |

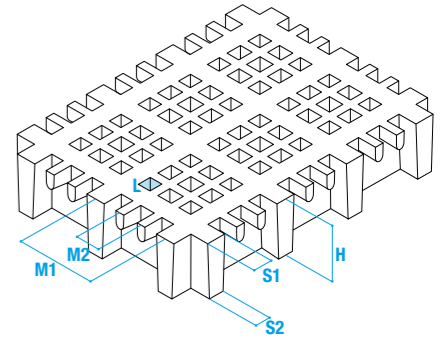


M = mesh
M1 = main mesh
M2 = secondary mesh
L = clear span
H = height
S1 = upper side beam thickness
S2 = lower side beam thickness

* Tolerance: ± 5 mm panel size / ± 2 mm height

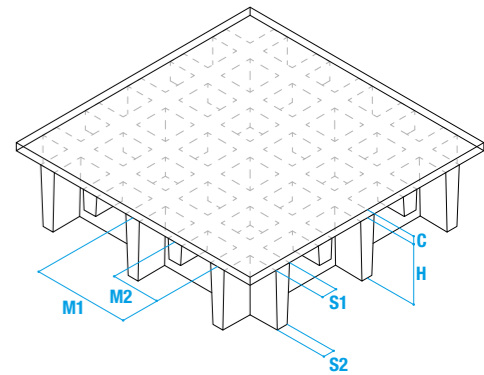
MICRO MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|----------|----------|--------|-------|------|------|--|-------------------|
| SCH12/30 | 38x38 mm | 12x12 mm | 8x8 mm | 30 mm | 7 mm | 5 mm | 1.000x4.038 mm 1.220x3.660 mm | 16,0 |
| SCH12/38 | 40x40 mm | 12x12 mm | 8x8 mm | 38 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 23,5 |



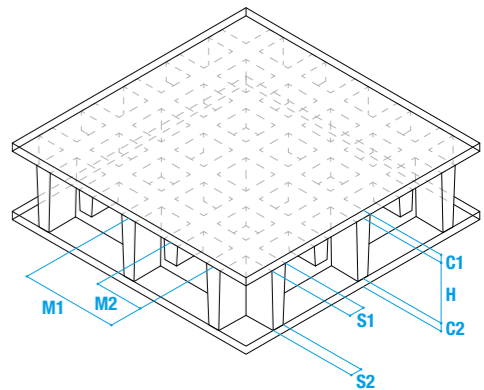
COVERED

| | M1 | M2 | C | H+C | S1 | S2 | STANDARD PANELS* | kg/m ² |
|------------|----------|----------|------|--------|-------|------|--|-------------------|
| SCH38/17C | 38x38 mm | | 3 mm | 20 mm | 7 mm | 5 mm | 1.220x3.660 mm | 15,0 |
| SCH38/25C | 38x38 mm | | 3 mm | 28 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 20,0 |
| SCH38/30C | 38x38 mm | | 3 mm | 33 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 23,0 |
| SCH38/38C | 38x38 mm | | 3 mm | 41 mm | 7 mm | 5 mm | 1.000x3.660 mm 1.220x3.660 mm | 25,0 |
| SCH50/50C | 50x50 mm | | 3 mm | 53 mm | 8 mm | 5 mm | 1.220x3.660 mm | 27,5 |
| SCH52/52C | 52x52 mm | 26x26 mm | 3 mm | 55 mm | 8 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm | 35,5 |
| SCH52/100C | 52x52 mm | 26x26 mm | 3 mm | 103 mm | 10 mm | 8 mm | 1.010x1.495 mm | 63,0 |



DOUBLE COVERED

| | M1 | M2 | C1 | C2 | H+C1+C2 | S1 | S2 | STANDARD PANELS* | kg/m ² |
|-------------|----------|----------|------|------|---------|-------|------|--|-------------------|
| SCH38/17DC | 38x38 mm | | 3 mm | 3 mm | 23 mm | 7 mm | 5 mm | 1.220x3.660 mm | 21,0 |
| SCH38/25DC | 38x38 mm | | 3 mm | 3 mm | 31 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 25,0 |
| SCH38/30DC | 38x38 mm | | 3 mm | 3 mm | 36 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 27,5 |
| SCH38/38DC | 38x38 mm | | 3 mm | 3 mm | 44 mm | 7 mm | 5 mm | 1.000x1.800 mm 1.000x3.660 mm 1.220x3.660 mm | 30,0 |
| SCH50/50DC | 50x50 mm | | 3 mm | 3 mm | 56 mm | 8 mm | 5 mm | 1.220x3.660 mm | 35,5 |
| SCH52/52DC | 52x52 mm | 26x26 mm | 3 mm | 3 mm | 58 mm | 8 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm | 44,5 |
| SCH52/100DC | 52x52 mm | 26x26 mm | 3 mm | 3 mm | 106 mm | 10 mm | 8 mm | 1.010x1.495 mm | 70,0 |



M = mesh
M1 = main mesh
M2 = secondary mesh
C1 = upper laminate thickness
C2 = lower laminate thickness
H+C1+C2 = total height
S1 = upper side beam thickness
S2 = lower side beam thickness

* Tolerance: ± 5 mm panel size / ± 2 mm height

PREMIUM LINE

MM
ISO / VIN

The high chemical resistance gratings are suitable for use in **chemically aggressive environments** such as the chemical, galvanic, extractive, manufacturing industries (tanneries, paper mills, etc.) and waste treatment plants.

The premium line gratings are produced with pure **isophthalic** or **vinylester** resins, reinforced with **ECR** glass fibres without inorganic additives and generally non-pigmented to obtain products with excellent resistance to chemical and environmental aggression and outstanding performance at high temperatures.

They are tested and classified as **excellent electrical insulators**.

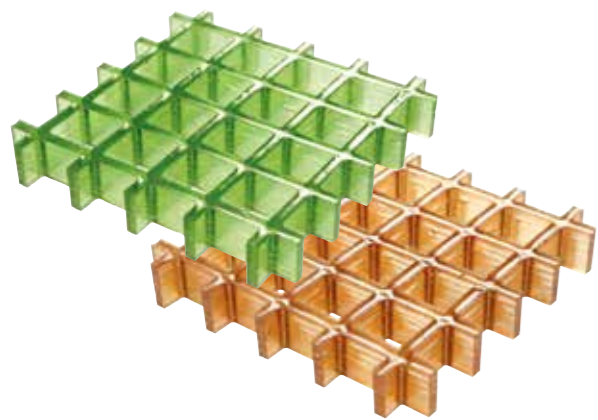
PURE RESINS

HIGH CHEMICAL RESISTANCE

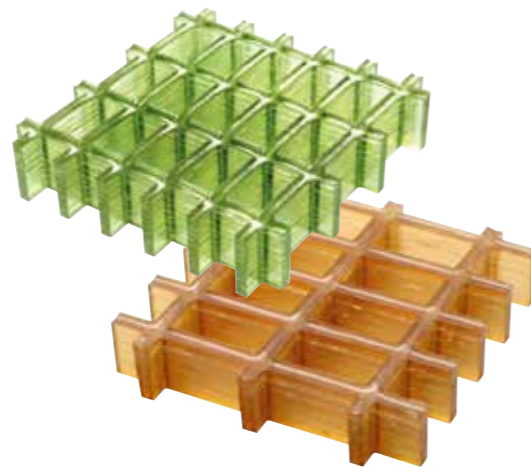
HIGH TEMPERATURE RESISTANT



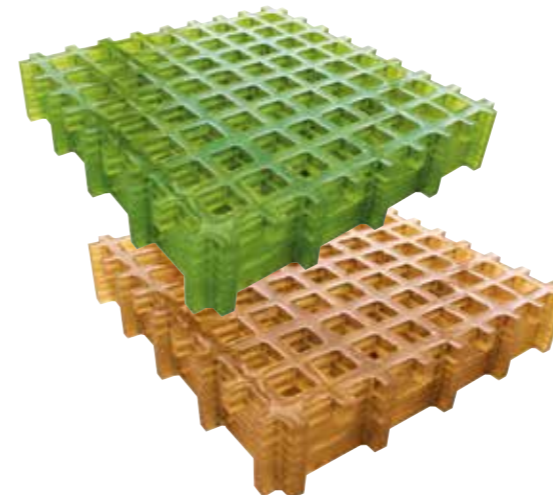
MESHES



SQUARE MESH



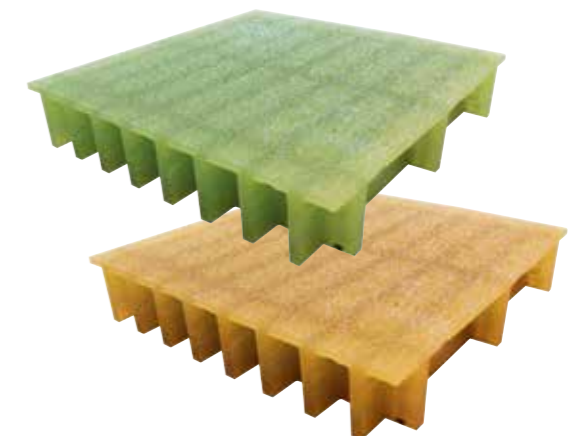
RECTANGULAR MESH



MINI MESH

Mesh colours are purely indicative

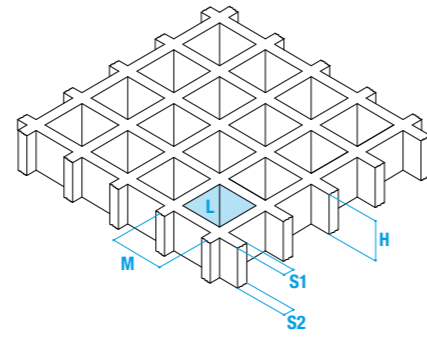
Mesh colours are purely indicative



COVERED

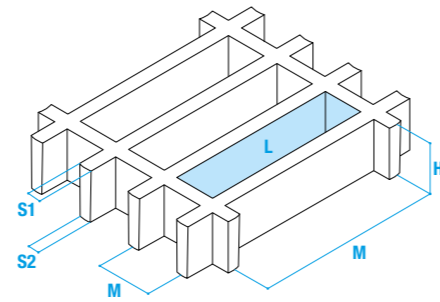
SQUARE MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|--------------|----------|----------|-------|------|------|--|-------------------|
| SCH38/38 | 38x38 mm | 31x31 mm | 38 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm 1.220x4.038 mm | 18,0 |
| SCH40/30 | 40x40 mm | 33x33 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.200x3.000 mm | 12,0 |
| SCH40/38 | 40x40 mm | 32x32 mm | 38 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.200x3.000 mm | 19,0 |
| SCH50/50_HDL | 50x50 mm | 42x42 mm | 50 mm | 8 mm | 7 mm | 1.300x2.000 mm | 23,0 |



RECTANGULAR MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|-----------|----------|-------|------|------|--|-------------------|
| SCH30/28 | 100x30 mm | 92x22 mm | 28 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.200x3.000 mm 1.500x2.000 mm | 12,0 |
| SCH30/38 | 100x30 mm | 92x22 mm | 38 mm | 8 mm | 7 mm | 1.200x3.000 mm | 18,0 |
| SCH50/28 | 50x30 mm | 42x22 mm | 28 mm | 8 mm | 7 mm | 1.000x2.000 mm | 15,0 |
| SCH60/28 | 100x60 mm | 92x52 mm | 28 mm | 8 mm | 7 mm | 1.500x2.000 mm | 8,0 |
| SCH68/50 | 100x68 mm | 92x60 mm | 50 mm | 8 mm | 7 mm | 1.100x2.200 mm | 15,0 |

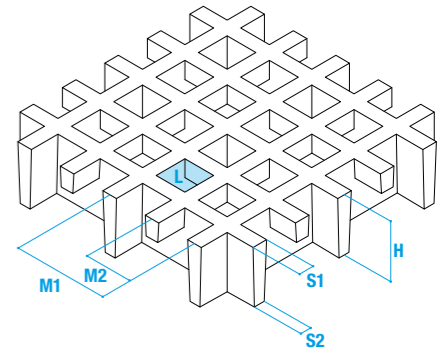


M = mesh
M1 = main mesh
M2 = secondary mesh
L = clear span
H = height
S1 = upper side beam thickness
S2 = lower side beam thickness

*Tolerance: ± 5 mm panel size / ± 2 mm height

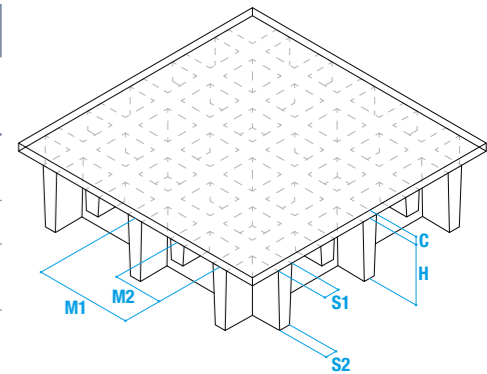
MINI MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|----------|----------|----------|-------|------|------|--|-------------------|
| SCH52/30 | 50x50 mm | 25x25 mm | 19x19 mm | 30 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.200x3.000 mm 1.500x2.000 mm | 13,5 |
| SCH52/40 | 50x50 mm | 25x25 mm | 19x19 mm | 40 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.500x2.000 mm | 19,0 |



COVERED

| | M1 | C | H+C | S1 | S2 | STANDARD PANELS* | kg/m ² |
|---------------|-----------|------|-------|------|------|----------------------------------|-------------------|
| SCH30/28C | 100x30 mm | 5 mm | 35 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.200x3.000 mm | 19,0 |
| SCH30/38C | 100x30 mm | 5 mm | 45 mm | 8 mm | 7 mm | 1.200x3.000 mm | 22,5 |
| SCH40/30C | 40x40 mm | 5 mm | 35 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.200x3.000 mm | 18,0 |
| SCH40/38C | 40x40 mm | 5 mm | 45 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.200x3.000 mm | 27,0 |
| SCH50/50C_HDL | 50x50 mm | 5 mm | 55 mm | 8 mm | 7 mm | 1.300x2.000 mm | 26,0 |



M = mesh
M1 = main mesh
M2 = secondary mesh
C = upper laminate thickness
H+C = total height
S1 = upper side beam thickness
S2 = lower side beam thickness

*Tolerance: ± 5 mm panel size / ± 2 mm height

CONDUCTIVE LINE

MM
CFR



The **conductive (CFR) gratings** line is designed for use in environments where, in addition to the typical properties of fibreglass gratings, it is required that they do **not accumulate electrostatic charges** and can dissipate electric charges.

These gratings, obtained by adding the resin of conductive agents, have a surface resistivity between 0 and $10^5 \Omega$.

In addition to the conductive gratings line, by applying the **ESD-LINE finishing**, gratings manufactured with any resin can be made **antistatic dissipative** (surface resistivity between 10^6 and $10^{12} \Omega$).

They are suitable for use in:

- areas with controlled static electricity (ESD)
- ATEX areas (2014/34/EU Directive)
- shipbuilding sector
- areas characterized by the presence of electric fields.

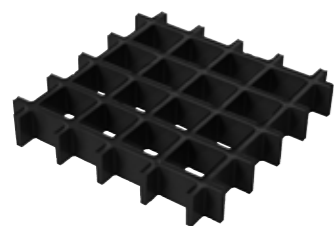
CONDUCTORS

BLACK COLOUR

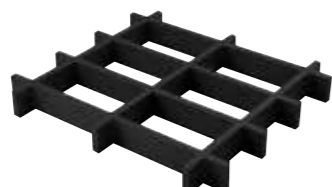
FOR AREAS WITH CONTROLLED STATIC ELECTRICITY

CONDUCTIVE GRATINGS

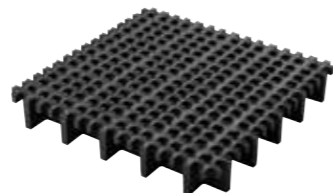
Conductive gratings (CFR) are excellent conductors and allow the quick dissipation of electric charges; the resin is added with conductive powder (carbon black) which gives the electrical conductivity and the typical black colour.



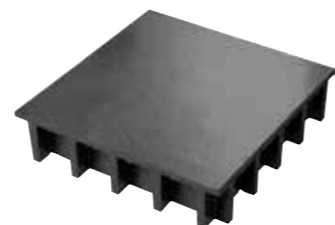
SQUARE MESH



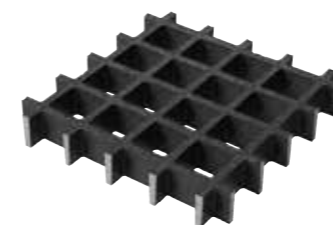
RECTANGULAR MESH



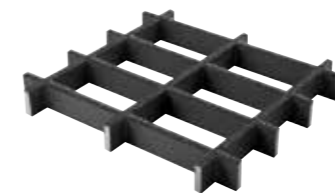
MICRO MESH



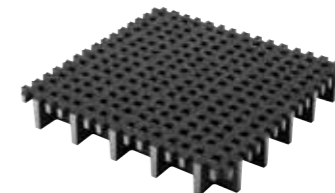
COVERED



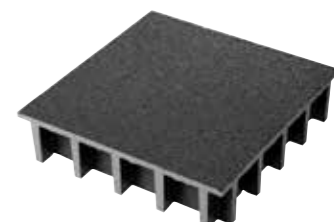
SQUARE MESH



RECTANGULAR MESH



MICRO MESH



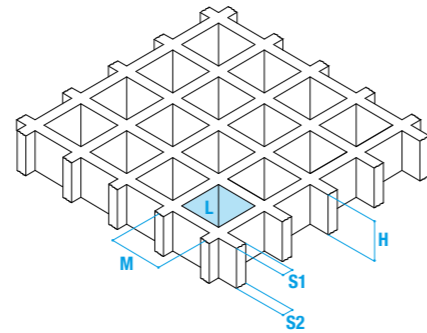
COVERED

ANTISTATIC GRATINGS ESD_LINE

The ESD_LINE finishing can be applied on gratings of the standard line or premium line. This is a special surface treatment based on conductive resin and quartz, which gives the product antistatic-dissipative properties, thus preventing the formation and accumulation of electrostatic charges.

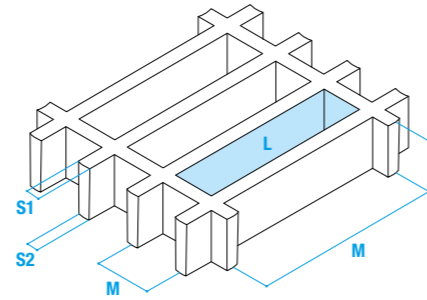
SQUARE MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|----------|----------|-------|-------|------|--|-------------------|
| SCH38/15 | 38x38 mm | 31x31 mm | 15 mm | 7 mm | 5 mm | 1.220x3.660 mm | 5,0 |
| SCH38/25 | 38x38 mm | 31x31 mm | 25 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm | 11,0 |
| SCH38/30 | 38x38 mm | 31x31 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm | 15,0 |
| SCH38/38 | 38x38 mm | 31x31 mm | 38 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.038 mm 1.220x3.660 mm 1.220x4.038 mm 1.528x4.038 mm | 18,0 |
| SCH38/60 | 38x38 mm | 27x27 mm | 60 mm | 11 mm | 9 mm | 1.240x3.660 mm | 62,0 |
| SCH50/50 | 50x50 mm | 42x42 mm | 50 mm | 8 mm | 5 mm | 1.220x3.660 mm | 19,5 |



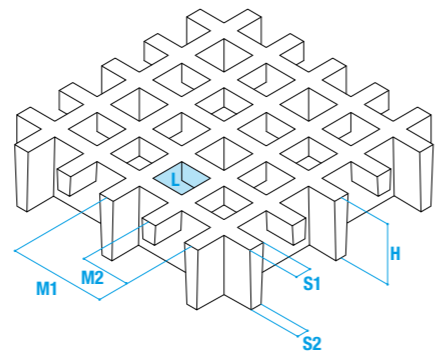
RECTANGULAR MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|-----------|----------|-------|------|------|----------------------------------|-------------------|
| SCH30/28 | 100x30 mm | 92x22 mm | 28 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.500x2.000 mm | 13,0 |
| SCH60/25 | 100x60 mm | 93x53 mm | 25 mm | 7 mm | 5 mm | 1.500x2.000 mm | 7,0 |
| SCH60/28 | 100x60 mm | 92x52 mm | 28 mm | 8 mm | 7 mm | 1.500x2.000 mm | 9,0 |



MINI MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|-----------|----------|----------|----------|--------|-------|------|--|-------------------|
| SCH52/30 | 52x52 mm | 26x26 mm | 19x19 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm 1.220x3.660 mm 1.500x2.000 mm | 15,0 |
| SCH52/40 | 52x52 mm | 26x26 mm | 19x19 mm | 40 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm 1.500x2.000 mm | 21,0 |
| SCH52/52 | 52x52 mm | 26x26 mm | 19x19 mm | 52 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm | 26,5 |
| SCH52/100 | 52x52 mm | 26x26 mm | 19x19 mm | 100 mm | 10 mm | 8 mm | 1.010x1.495 mm | 56,0 |
| SCH13/30 | 40x40 mm | 20x20 mm | 13x13 mm | 30 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 19,0 |
| SCH13/38 | 40x40 mm | 20x20 mm | 13x13 mm | 38 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 23,5 |

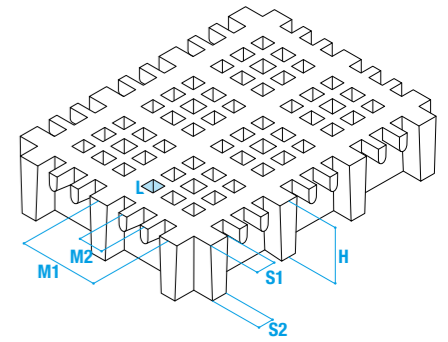


M = mesh
M1 = main mesh
M2 = secondary mesh
L = clear span
H = height
S1 = upper side beam thickness
S2 = lower side beam thickness

* Tolerance: ± 5 mm panel size / ± 2 mm height

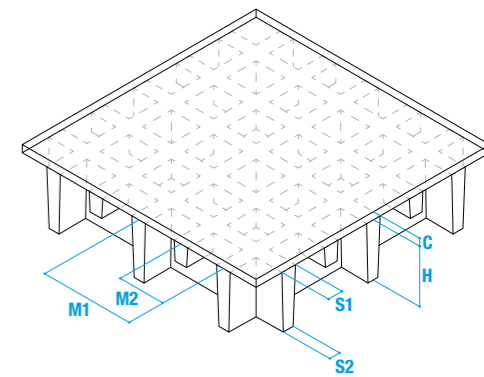
MICRO MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|----------|----------|----------|--------|-------|------|------|--|-------------------|
| SCH12/30 | 38x38 mm | 12x12 mm | 8x8 mm | 30 mm | 7 mm | 5 mm | 1.000x4.038 mm 1.220x3.660 mm | 16,0 |
| SCH12/38 | 40x40 mm | 12x12 mm | 8x8 mm | 38 mm | 7 mm | 5 mm | 1.007x3.007 mm 1.007x4.047 mm 1.247x4.047 mm | 23,5 |



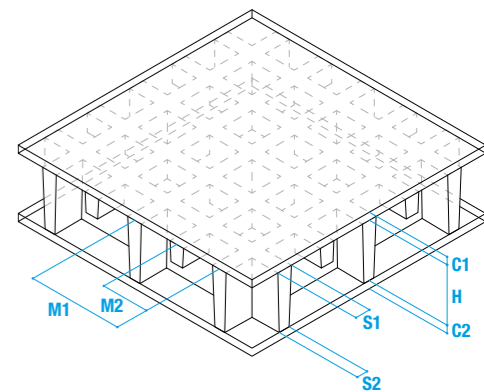
COVERED

| | M1 | M2 | C | H+C | S1 | S2 | STANDARD PANELS* | kg/m ² |
|------------|----------|----------|------|--------|-------|------|--|-------------------|
| SCH38/17C | 38x38 mm | | 3 mm | 20 mm | 7 mm | 5 mm | 1.220x3.660 mm | 15,0 |
| SCH38/25C | 38x38 mm | | 3 mm | 28 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 20,0 |
| SCH38/30C | 38x38 mm | | 3 mm | 33 mm | 7 mm | 5 mm | 1.000x2.000 mm 1.000x4.038 mm 1.220x3.660 mm | 23,0 |
| SCH38/38C | 38x38 mm | | 3 mm | 41 mm | 7 mm | 5 mm | 1.000x3.660 mm 1.220x3.660 mm | 25,0 |
| SCH50/50C | 50x50 mm | | 3 mm | 53 mm | 8 mm | 5 mm | 1.220x3.660 mm | 27,5 |
| SCH52/52C | 52x52 mm | 26x26 mm | 3 mm | 55 mm | 8 mm | 5 mm | 1.000x2.000 mm 1.000x3.000 mm 1.000x4.050 mm | 35,5 |
| SCH52/100C | 52x52 mm | 26x26 mm | 3 mm | 103 mm | 10 mm | 8 mm | 1.010x1.495 mm | 63,0 |



DOUBLE COVERED

| | M1 | M2 | C1 | C2 | H+C1+C2 | S1 | S2 | STANDARD PANELS* | kg/m ² |
|-------------|----------|----------|------|------|---------|-------|------|--|-------------------|
| SCH38/17DC | 38x38 mm | | 3 mm | 3 mm | 23 mm | 7 mm | 5 mm | 1220x3660 mm | 21,0 |
| SCH38/25DC | 38x38 mm | | 3 mm | 3 mm | 31 mm | 7 mm | 5 mm | 1000x2000 mm 1000x4038 mm 1220x3660 mm | 25,0 |
| SCH38/30DC | 38x38 mm | | 3 mm | 3 mm | 36 mm | 7 mm | 5 mm | 1000x2000 mm 1000x4038 mm 1220x3660 mm | 27,5 |
| SCH38/38DC | 38x38 mm | | 3 mm | 3 mm | 44 mm | 7 mm | 5 mm | 1000x1800 mm 1000x3660 mm 1220x3660 mm | 30,0 |
| SCH50/50DC | 50x50 mm | | 3 mm | 3 mm | 56 mm | 8 mm | 5 mm | 1220x3660 mm | 35,5 |
| SCH52/52DC | 52x52 mm | 26x26 mm | 3 mm | 3 mm | 58 mm | 8 mm | 5 mm | 1000x2000 mm 1000x3000 mm 1000x4050 mm | 44,5 |
| SCH52/100DC | 52x52 mm | 26x26 mm | 3 mm | 3 mm | 106 mm | 10 mm | 8 mm | 1010x1495 mm | 70,0 |



M = mesh
M1 = main mesh
M2 = secondary mesh
C1 = upper laminate thickness
H+C = total height
C2 = lower laminate thickness
S1 = upper side beam thickness
S2 = lower side beam thickness

* Tolerance: ± 5 mm panel size / ± 2 mm height

POTABLE WATER LINE

M.M.
ACS

We offer a line of **gratings for use in direct contact with drinking water** in accordance with Directive 98/83/EC (Drinking water directive).

Raw materials, process additives and reaction promoters are all included in the positive list referred to in the (EU) Regulation 10/2011.

Gratings are available in natural colour (without pigments) with a smooth or meniscus finishing.

NON-SLIP

CERTIFIED RAW MATERIALS

AUTHORIZED BY PUBLIC AUTHORITIES



The health compliance certificate (ACS) is an official document issued by the **French General Health Department** after that the prescribed tests have been performed by accredited laboratories in compliance with the European Directive 98/83/EC concerning the quality of water intended for human consumption.

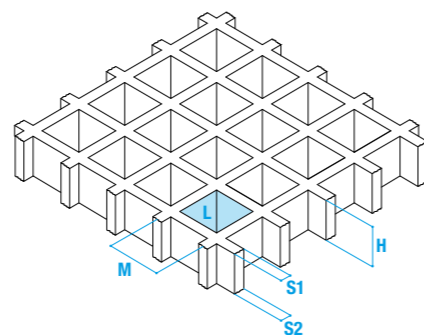


Ministero della Salute

The Italian Ministry of Health has declared M.M. products **compliant with the Ministerial Decree 174/2004** concerning materials and objects that can be used in fixed plants for the collection, treatment, supply and distribution of water intended for human consumption and **authorized their use**.

SQUARE MESH

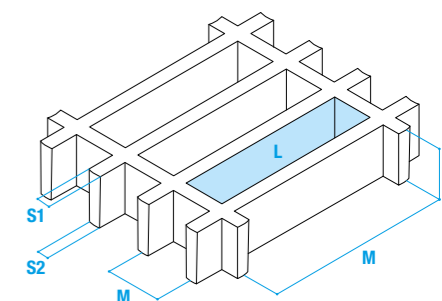
| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|---------------|----------|----------|-------|------|------|------------------|-------------------|
| SCH 40/30_ACS | 40x40 mm | 33x33 mm | 30 mm | 7 mm | 5 mm | 1.000x2.000 mm | 12,0 |
| SCH 40/38_ACS | 40x40 mm | 32x32 mm | 38 mm | 8 mm | 7 mm | 1.000x2.000 mm | 19,0 |



* Tolerance: ± 5 mm panel size / ± 2 mm height

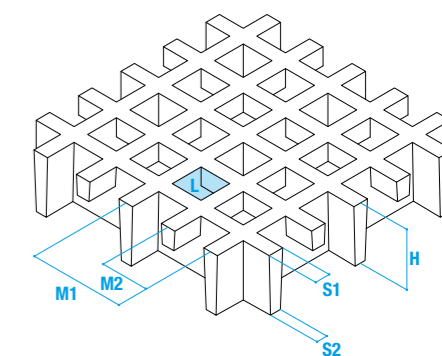
RECTANGULAR MESH

| | M | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|---------------|-----------|----------|-------|------|------|------------------|-------------------|
| SCH 30/28_ACS | 100x30 mm | 92x22 mm | 28 mm | 8 mm | 7 mm | 1.000x2.000 mm | 12,0 |



MINI MESH

| | M1 | M2 | L | H | S1 | S2 | STANDARD PANELS* | kg/m ² |
|---------------|----------|----------|----------|-------|------|------|----------------------------------|-------------------|
| SCH 52/30_ACS | 50x50 mm | 25x25 mm | 19x19 mm | 30 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.500x2.000 mm | 13,5 |
| SCH 52/40_ACS | 50x50 mm | 25x25 mm | 19x19 mm | 40 mm | 8 mm | 7 mm | 1.000x2.000 mm 1.500x2.000 mm | 19,0 |



M = mesh / M1 = main mesh / M2 = secondary mesh / L = clear span / H = height / S1 = upper side beam thickness / S2 = lower side beam thickness

02

MARINADECK



Thanks to its **resistance to the brackish environment**, its **limited thermal expansion**, its non-slip characteristics in accordance with the DIN 51097 standard (suitable for walking on bare feet) and its **resistance to UV rays**, Marinadeck is ideal for **dock and quay floorings of private marinas and tourist harbours**.

It is also an excellent product to use for walking surfaces near swimming pools and access areas to **water park** slides (non-slip in accordance with the EN13451-1 standard).

CUSTOMIZABLE

Q-PAINT FINISHING SUITABLE FOR BARE FOOT WALKING

DECKING PLANK DESIGN, WOOD OR STONE EFFECT

DURABILITY OF NON-SLIP PROPERTIES

The Q-paint finishing can be applied to all gratings with a covered surface, with mini or micro mesh.

The Q-PAINT finishing has been subjected to the strict pendulum test of the Australian Standard HB197, whose results are classified according to a number of very sophisticated parameters.

The “**slip class**” obtained over a wet surface is “**V**” (the highest), both in the test with the rigid pad (with shoes) and in the one with the soft pad (bare feet).

The test was repeated after that the sample was subjected to 500 abrasion cycles with a 2 kg pad to simulate an intensive use of the floor surface.

The result of the pendulum test after the wear cycles remained “V”, confirming the durability over time of the non-slip properties.



CHARACTERISTICS

MDK 20152

| | |
|------------------------|--|
| MATERIAL | 65% polyester resin, 35% fibreglass, pigments and fillers |
| COLOURS | brown RAL 8004 grey RAL 7004 green RAL 6000 available upon request in other colours |
| HEIGHT | 20 mm |
| STANDARD PANELS | 1.220x3.660 mm |
| WEIGHT | 15 kg/m ² |

MDK 1230

| | |
|------------------------|--|
| MATERIAL | 65% polyester resin, 35% fibreglass, pigments and fillers |
| COLOURS | brown RAL 8004 grey RAL 7004 green RAL 6000 available upon request in other colours |
| HEIGHT | 30 mm |
| STANDARD PANELS | 1.000x4.038 mm 1.220x3.660 mm |
| WEIGHT | 16 kg/m ² |



STEPS AND STEP COVERS

Gratings can be cut to size for making simple steps, or fitted with a yellow stair noosing. The non-slip surface of our steps ensures the highest possible level of safety for operators.

Upon request, our technical department can develop personalized solutions for particular and large-sized steps.

Moreover, steps can be supplied complete with stainless steel angular profiles specially designed to support them.

For securing existing stairs we offer a simple, efficient and cost-effective solution: step covers. They are corrosion-resistant, non-slip and can be installed very quickly.

NON-SLIP

CUSTOM-DESIGNED

SIMPLE OR WITH FRONT PLATE CAN

STEPS

Steps can be supplied with two **surface finishings**:

- with non-slip **meniscus-type** surface (with R13 DIN 51130 certification)
- with non-slip **quartz** surface (with R13 DIN 51130 certification)

A yellow front plate can be applied to the steps.

SIMPLE



WITH YELLOW FRONT PLATE CAN

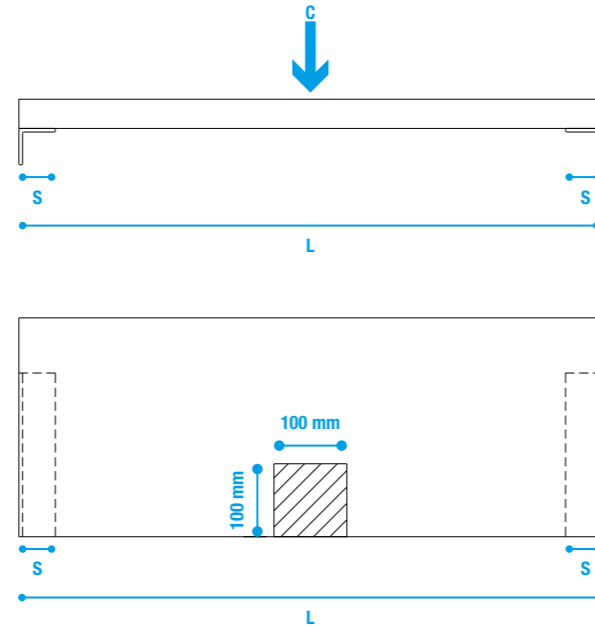


STEPS

The table shows the step widths which, when subjected to a load of 150 kg, have a deflection equal to 1/300 of the loading span.

The tests and calculations were carried out using the load model indicated in the UNI EN 14122-3 standard, i.e. load of 150 kg applied on a footprint of 100x100 mm at the centre line of the step.

Support width 50 mm. Step with 4 fixing points



SIMPLE STEP

| | STEP WIDTH deflection (1/300 L) | 600 < 2 mm | 700 < 2,3 mm | 800 < 2,6 mm | 900 < 3 mm | 1.000 < 3,3 mm | 1.100 < 3,6 mm | 1.200 < 4 mm |
|--------|------------------------------------|---------------|-----------------|-----------------|---------------|-------------------|-------------------|-----------------|
| TIPO 1 | SCH38/30 | | | | | | | |
| TIPO 2 | SCH52/30 | | | | | | | |
| TIPO 3 | SCH12/30 | | | | | | | |
| TIPO 4 | SCH38/38 | | | | | | | |
| TIPO 5 | SCH52/40 | | | | | | | |
| TIPO 6 | SCH13/38 | | | | | | | |
| TIPO 7 | SCH50/50 | | | | | | | |
| TIPO 8 | SCH52/52 | | | | | | | |

STEP WITH YELLOW FRONT PLATE CAN

| | STEP WIDTH deflection (1/300 L) | 600 < 2 mm | 700 < 2,3 mm | 800 < 2,6 mm | 900 < 3 mm | 1.000 < 3,3 mm | 1.100 < 3,6 mm | 1.200 < 4 mm |
|--------|------------------------------------|---------------|-----------------|-----------------|---------------|-------------------|-------------------|-----------------|
| TIPO 1 | SCH38/30 | | | | | | | |
| TIPO 2 | SCH52/30 | | | | | | | |
| TIPO 3 | SCH12/30 | | | | | | | |
| TIPO 4 | SCH38/38 | | | | | | | |
| TIPO 5 | SCH52/40 | | | | | | | |
| TIPO 6 | SCH13/38 | | | | | | | |
| TIPO 7 | SCH50/50 | | | | | | | |
| TIPO 8 | SCH52/52 | | | | | | | |

The values shown in the table are mean values obtained by interpolating experimental and calculation values, taking into account the increase in rigidity attributable to the fixings. They can vary depending on the type of resin.

STEP COVERS

Step covers are ideal for **securing and making safe stairway steps** in all industrial and residential environments. Step covers are made with self-extinguishing polyester resin reinforced with fibreglass.

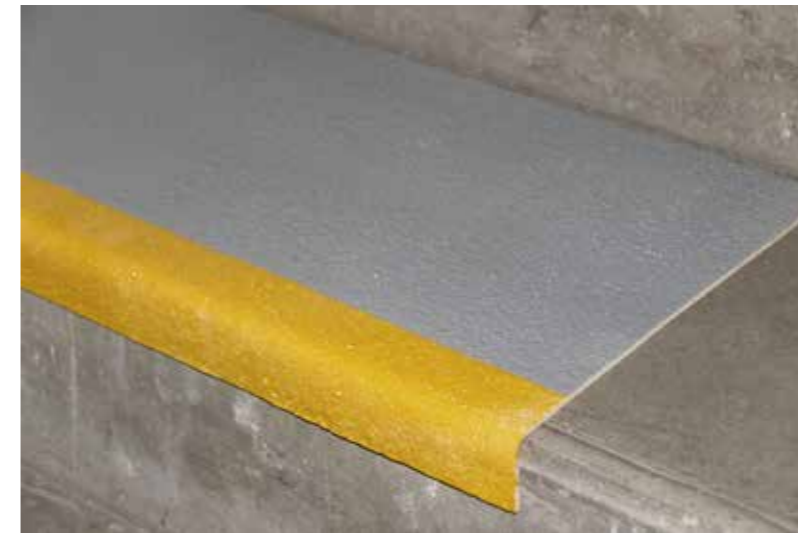
They are easily installed on existing wooden, concrete and steel stairs.

The laminate's surface is treated with quartz granules in order to give the surface the high slip resistance R13 (DIN 51130 standard) and increase its durability.

The front plate can of the step cover is finished in yellow in order to highlight the tread and improve the safety of the stairs.

They are produced in standard size, but can be supplied cut to size according to the size of the steps to be covered.

Step covers can be easily fixed to existing steps using feed through screws, anchor bolts or adhesive tape.



| | |
|-----------------|-----------------------------|
| LENGTH | 3.660 mm |
| WIDTH | 345 mm |
| HEIGHT | 40 mm |
| THICKNESS | 4 mm |
| STANDARD COLOUR | grey RAL 7004 + yellow band |

DUCTS AND MANHOLES



Electrically insulated, highly resistant to loads, easy laying and workability are the features that make the gratings with covered top the right solution for **covering cable ducts and manholes** in plants for the production, transformation and transmission of electricity.

Available complete of fibreglass lodging angular, they do not require earthing or maintenance and, due to their lightweight, they can easily be **fitted and removed by hand**.

The covered top also prevents the release of gas or odours, making the covered top gratings an excellent solution for wastewater treatment plants. Thanks to their chemical resistance, gratings are ensured a long life.

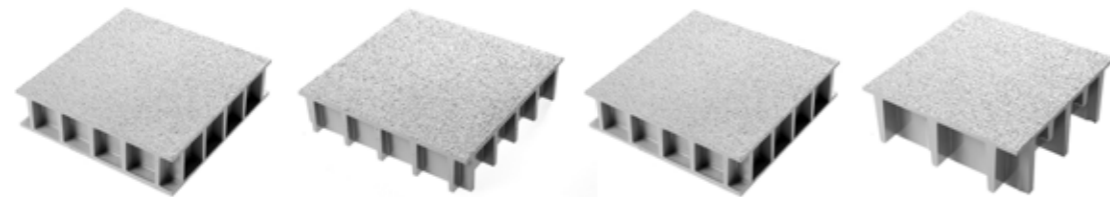
DIELECTRIC

CORROSION- RESISTANT

LIGHT AND EASY TO INSTALL

COVERS FOR VEHICULAR TRAFFIC CLASSIFICATION ACCORDING TO SPECIFICATIONS USED BY SOME ELECTRICAL COMPANIES

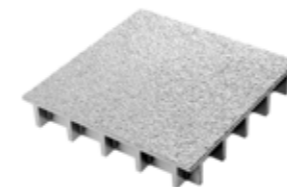
Single or double covered top gratings can be used to cover ducts and manholes suitable for vehicular traffic. Lodging angulars to be embedded in the concrete casting are available.



| | | | | |
|------------------------------|---|---|---------------------------|---------------------------|
| LOAD | 5.000 daN | 2.000 daN | 5.000 daN | 2.000 daN |
| GRATING TYPE | SCH38/38DC | SCH38/38C | SCH50/50DC SCH52/52DC | SCH50/50C SCH52/52C |
| DUCT INTERNAL WIDTH | 500 mm | 500 mm | 800 mm | 800 mm |
| LODGING ANGULAR | 50x50x5 self-anchoring 50x50x5 with metal clamps | 50x50x5 self-anchoring 50x50x5 with metal clamps | 60x60x5 with metal clamps | 60x60x5 with metal clamps |
| BENDING BREAKING LOAD | >15.000 daN | >11.000 daN | >15.000 daN | >11.000 daN |

COVERS FOR PEDESTRIAN AREAS

FRP coverings for ducts and manholes can be supplied for pedestrian traffic.



| | |
|----------------------------|---------------------------|
| LOAD | pedestrian |
| GRATING TYPE | SCH38/25C |
| DUCT INTERNAL WIDTH | 500 - 800 mm |
| LODGING ANGULAR | 35x35x5 with metal clamps |

DRAINAGE CHANNEL

FRP grid drains for collecting rainwater (or washing water) that flows on the surface and which must be channelled into the sewage system.



| | |
|----------------------------|--|
| LOAD | pedestrian/vehicular |
| GRATING TYPE | SCH52/40 SCH52/52 |
| DUCT INTERNAL WIDTH | 500 - 800 mm |
| LODGING ANGULAR | 45x45x5 with metal clamps 60x60x5 with metal clamps |

FRAMES

FRAME WITH METAL CLAMPS

| ANGULAR PROF. | DESCRIPTION | COVERS | COLOUR |
|---------------|--|--|--------|
| CTT60605 | 53A60605 L profile L60x60x5 mm with clamps | SCH52/52DC, SCH52/52C, SCH52/52 | grey |
| CT50505 | 53A50505 L profile L50x50x5 mm with clamps | SCH38/38DC, SCH38/38C, SCH38/38 | grey |
| CT45455 | 53A45455 L profile L45x45x5 mm with clamps | SCH38/38, SCH40/38, SCH52/40 | grey |
| CT35355 | 53A35355 L profile L35x35x5 mm with clamps | SCH38/25C, SCH38/30, SCH40/30, SCH52/30, SCH12/30, SCH38/25DC, SCH38/30C | grey |
| CT30305 | 53A30305 L profile L30x30x5 mm with clamps | SCH38/25, SCH30/28, SCH50/28 | grey |



FRAME WITH SELF-ANCHORING PROFILE (no metal)

| ANGULAR PROFILE | DESCRIPTION | COVERS | COLOUR |
|-----------------|---------------------------|----------------------------------|--------|
| 53AW50505 | Shaped L profile L50x50x5 | SCH38/38DC, SCH38/38C, SCH40/38C | grey |



ANGULAR PROFILES

ANGULAR PROFILE WITH METAL CLAMPS

| ANGULAR PROF. | DESCRIPTION (HxBxS) | COVERS | COLOUR |
|---------------|--|--|--------|
| PL60605Z | 53A60605 L profile L60x60x5 with clamps Bar length 3.000 mm or 6.000 mm | SCH52/52DC, SCH52/52C, SCH52/52 | grey |
| PL50505Z | 53A50505 L profile L50x50x5 with clamps Bar length 3.000 mm or 6.000 mm | SCH38/38DC, SCH38/38C, SCH40/38C | grey |
| PL45455Z | 53A45455 L profile L45x45x5 with clamps Bar length 3.000 mm or 6.000 mm | SCH38/38, SCH40/38, SCH52/40 | grey |
| PL35355Z | 53A35355 L profile L35x35x5 with clamps Bar length 3.000 mm or 6.000 mm | SCH38/25C, SCH38/30, SCH40/30, SCH52/30, SCH12/30, SCH38/25DC, SCH38/30C | grey |
| PL30305Z | 53A30305 L profile L30x30x5 with clamps Bar length 3.000 mm or 6.000 mm | SCH38/25, SCH30/28, SCH50/28 | grey |



ANGULAR SELF-ANCHORING PROFILE (no metal)

| ANGULAR PROF. | DESCRIPTION (HxBxS) | COVERS | COLOUR |
|---------------|--|--------------------------------------|--------|
| 53AW50505 | Shaped angular profile L50x50x5 Bar length 3.000 mm or 6.000 mm | SCH38/38DC SCH38/38C SCH40/38C | grey |



DUCT MEASURES

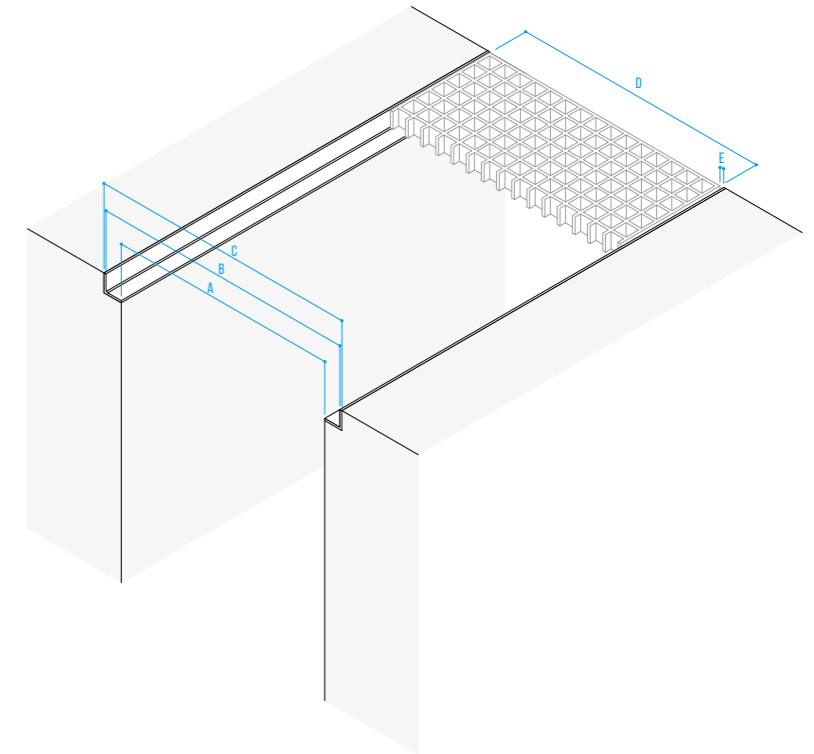
The following pit measurements must be taken:

- A Pit width
- B Internal frame width ($B = D + 2E$)
- C External frame width
- D Panel length
- E Free gap

The free gap for metal profiles is determined by the profile internal connector, while for the fibreglass profiles the standard free gap is 5 mm.

The resting base of the FRP panel on the angular profile must not be less than 2/3 of the grating thickness.

For ducts where the housing for the angular profile is not envisaged, it is possible to use FRP profiles fixed directly to the concrete with expansion bolts (at least 1 every 50 cm).



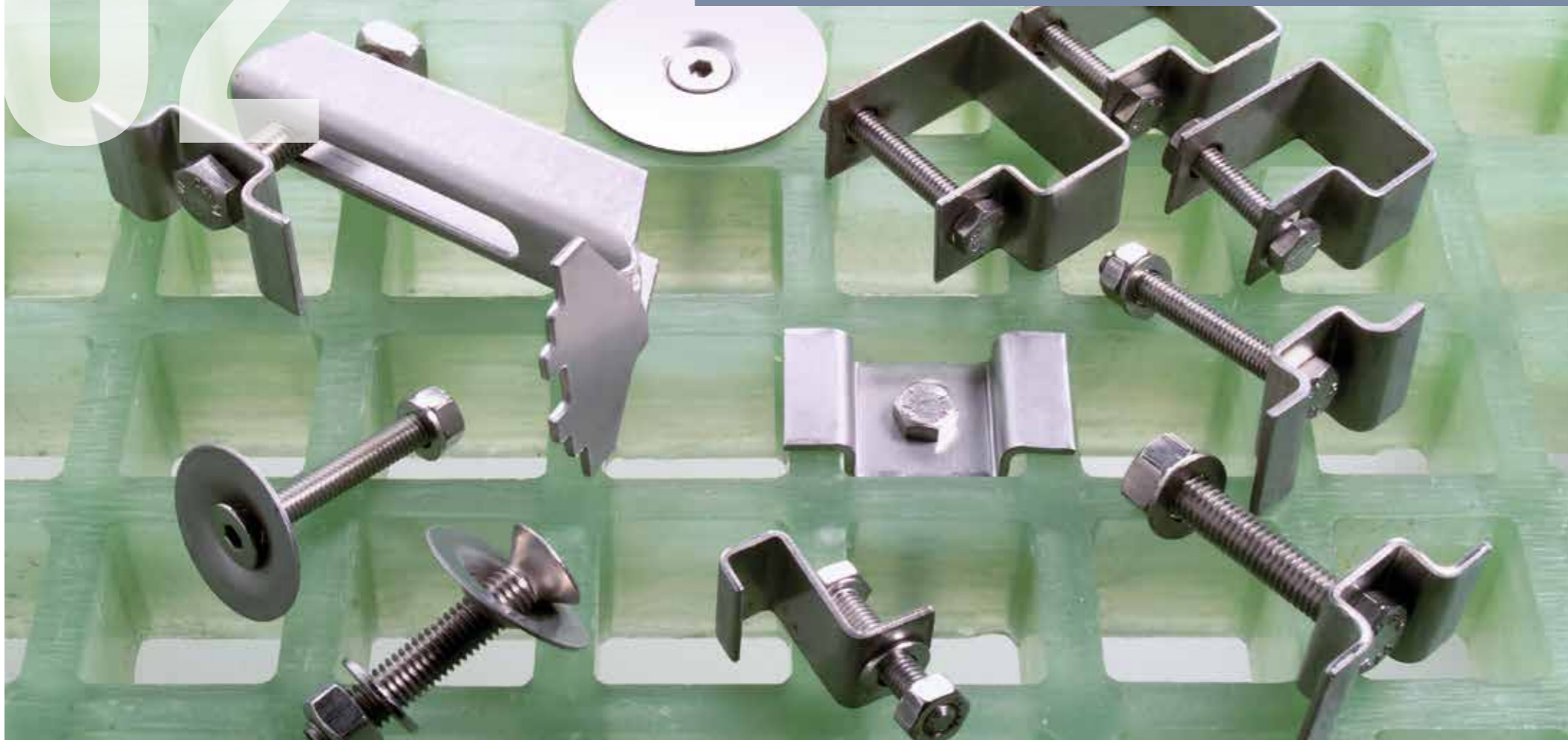
CROSS BEAMS

Cross beams are used when the clearance (A) and the load exceed the parameters set out in the dimension tables of the gratings.

If requested, beams can be supplied in FRP profiles.

GRATING ACCESSORIES

02



The **fixing systems** are made of AISI 316 stainless steel and are supplied complete with the nuts and bolts shown in the table. The system may require the drilling of the framework or, if this is not possible, the use of fixing brackets.

The **connection systems** are made of AISI 316 stainless steel and are supplied complete with the nuts and bolts shown in the table. The choice of clip depends on the thickness and type of the grating mesh.

The **adjustable supports** allow to install raised floors to allow, for example, the passage of cables and piping, the outflow of liquids or to compensate for unevenness. They are made of polypropylene and cover a variety of heights ranging from 28 mm to 550 mm.

VERSATILE

COMPLETE WITH NUTS AND BOLTS

AISI 316 STAINLESS STEEL

ADJUSTABLE SUPPORTS

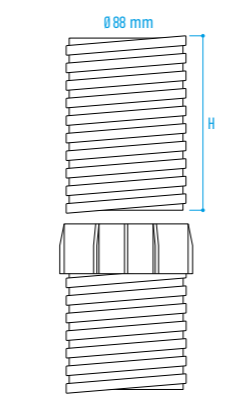
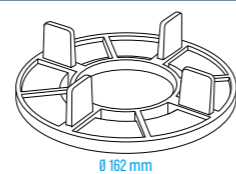
Adjustable polypropylene supports from 28 to 550 mm for the construction of raised floors using gratings.

Adjustable with finished floor level

Resistant to temperatures from -40° to +120° C

Resistant to acids, aging and UV rays

For use with any self-supporting outdoor flooring



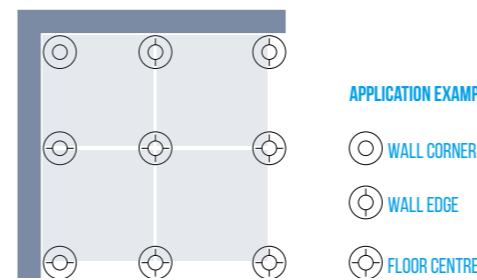
PLUSTEC fixed head

V screw
V0 18 mm
V1 22 mm
V2 35 mm
V3 60 mm
V4 105 mm
V5 155 mm

P1 extension
h 125 mm

Support base
B0 18 mm
B1 25 mm
B2 40 mm
B3 65 mm

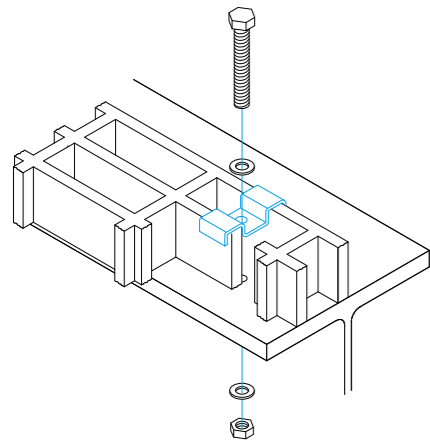
| | HEIGHT | |
|-----|------------|--|
| SE0 | 28-38 mm | |
| SE1 | 37,5-50 mm | |
| SE2 | 50-75 mm | |
| SE3 | 75-120 mm | |
| SE4 | 120-170 mm | |
| SE5 | 170-215 mm | |



| | HEIGHT | COMPOSITION | |
|------|------------|-------------|--|
| SE6 | 140-230 mm | SE3 + 1 P1 | |
| SE7 | 185-275 mm | SE4 + 1 P1 | |
| SE8 | 235-325 mm | SE5 + 1 P1 | |
| SE9 | 205-345 mm | SE3 + 2 P1 | |
| SE10 | 250-385 mm | SE4 + 2 P1 | |
| SE11 | 300-400 mm | SE5 + 2 P1 | |
| SE12 | 270-455 mm | SE3 + 3 P1 | |
| SE13 | 315-500 mm | SE4 + 3 P1 | |
| SE14 | 365-550 mm | SE5 + 3 P1 | |

Maximum load applicable on each support: 1.000 kg
Maximum height: 550 mm

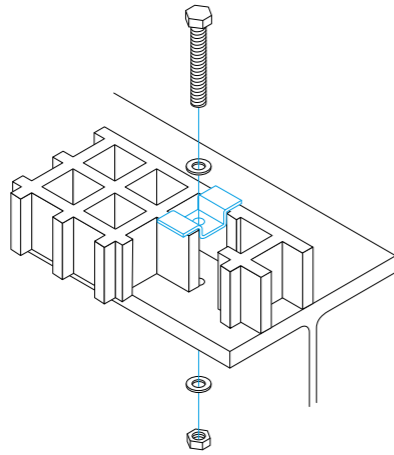
FIXING SYSTEMS



CLAMP D30/7 E D30/9

Can be used on gratings

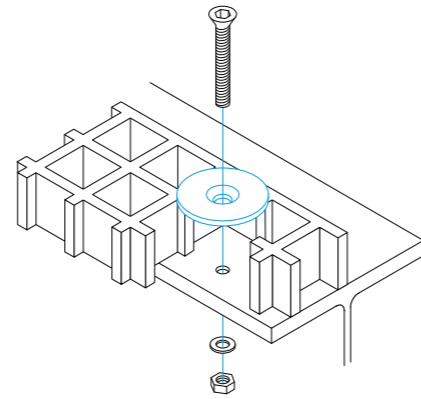
SCH30/28, SCH50/28



CLAMP D40/7 E D40/9

Can be used on gratings

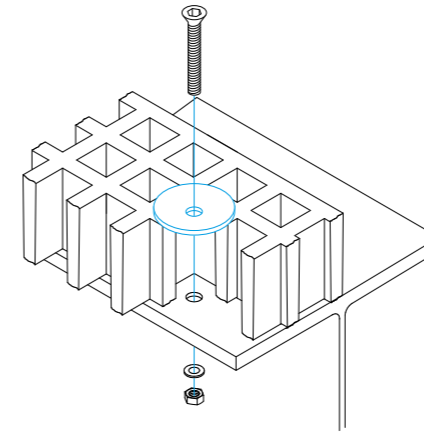
SCH38/15, SCH38/25, SCH38/30, SCH38/38, SCH40/30, SCH40/38



CLAMP T50/9

Can be used on gratings

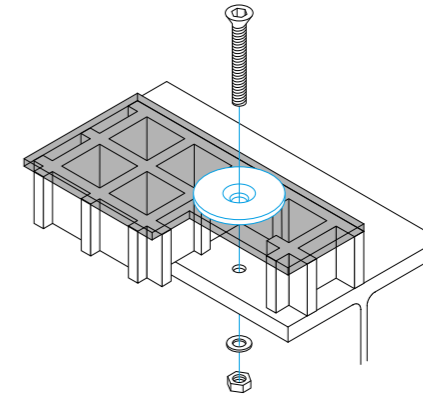
SCH50/50



CLAMP 19T7 E 19T9

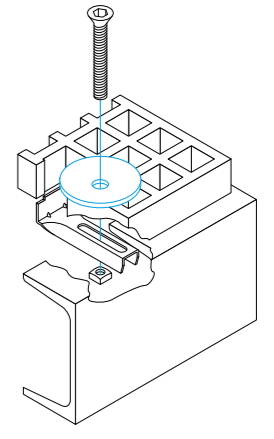
Can be used on gratings

SCH52/30, SCH52/40, SCH52/52, SCH12/30, SCH12/38, SCH13/30, SCH 13/38



CLAMP T7 E T9

Can be used on all type of gratings, except mini and micro mesh



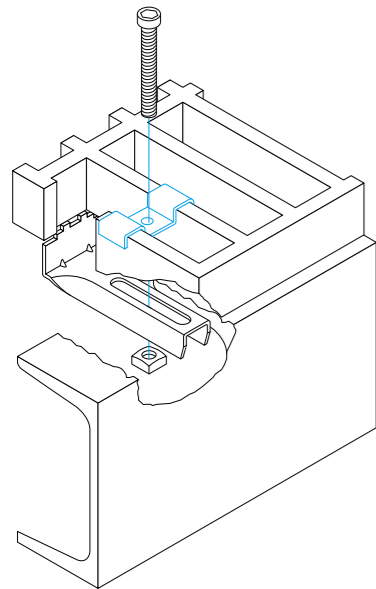
CLAMP 19T9 + BRACKET

Can be used on gratings

SCH52/30, SCH52/40, SCH52/52 with BRACKET 11
SCH13/30, SCH13/38, SCH12/30, SCH12/38 with BRACKET 6

Fixing clips in AISI 316 stainless steel, supplied complete with nuts and bolts. The installation requires the drilling of the support framework. Screws as shown in table of page 43.

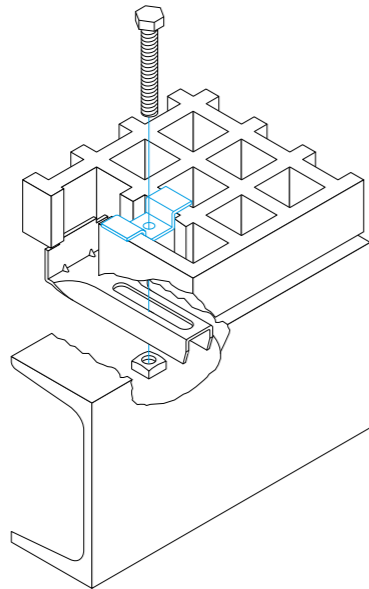
NUTS AND BOLTS FOR FIXING SYSTEMS



CLAMP D30/9 + BRACKET 1

Can be used on gratings

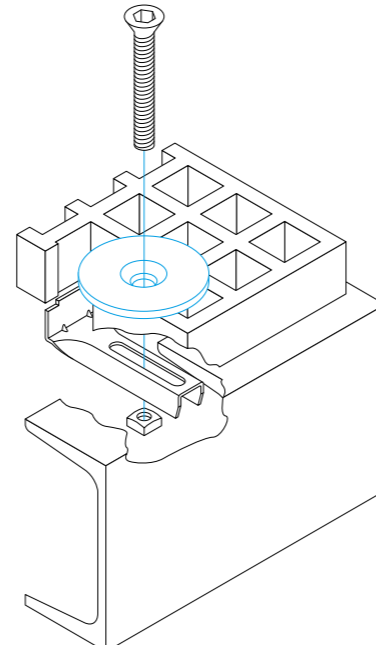
SCH30/28, SCH50/28, SCH50/38



CLAMP D40/9 + BRACKET 6

Can be used on gratings

SCH38/15, SCH38/25, SCH38/30, SCH38/38, SCH40/30, SCH40/38



CLAMP T50/9 + BRACKET 11

Can be used on gratings

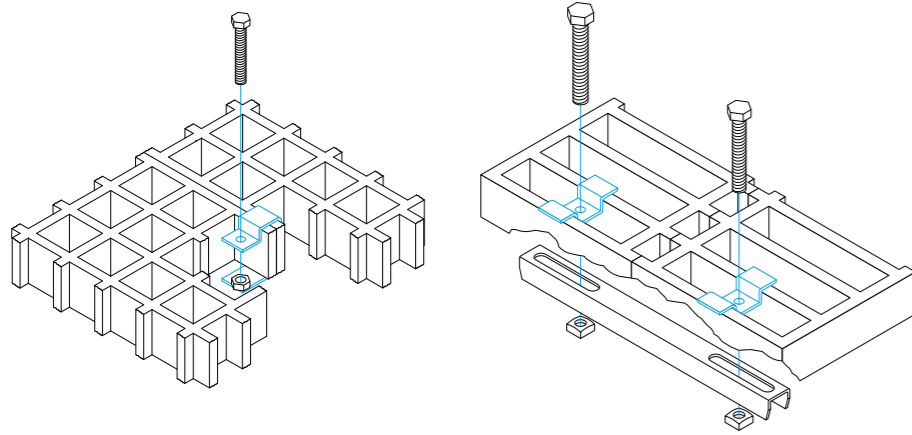
SCH50/50

| CLAMP | MESH | GRATING THICKNESS 15 / 25 / 28 / 30 mm | | | | GRATING THICKNESS 38 / 40 mm | | | | GRATING THICKNESS 50 / 52 mm | | | |
|-----------------|---------------------------|--|--------------------------|--------------|--------------|------------------------------|--------------------------|--------------|-----------|------------------------------|--------------|--------------|------------|
| | | SCREW | WASHER | NUT | BRACKET | SCREW | WASHER | NUT | BRACKET | SCREW | WASHER | NUT | BRACKET |
| D30/7 | rectangular | 100x30 50x30 | M6x50 DIN912 DIN84 | M6 DIN125 | M6 DIN985 | M6x70 DIN912 DIN84 | M6 DIN125 | M6 DIN985 | | | | | |
| D30/9 | rectangular | 100x30 50x30 | M8x50 DIN912 DIN84 | M8 DIN125 | M8 DIN985 | M8x70 DIN912 DIN84 | M8 DIN125 | M8 DIN985 | | | | | |
| D40/7 | square | 38x38 40x40 | M6x50 DIN933 | M6 DIN125 | M6 DIN985 | M6x70 DIN933 | M6 DIN125 | M6 DIN985 | | | | | |
| D40/9 | square | 38x38 40x40 | M8x50 DIN933 | M8 DIN125 | M8 DIN985 | M8x70 DIN933 | M8 DIN125 | M8 DIN985 | | | | | |
| T50/9 | square | 50x50 | | | | | | | | M8x90 DIN7991 | M8 DIN125 | M8 DIN985 | |
| D30/9 + bracket | rectangular | 100x30 50x30 | M8x50 DIN912 DIN84 | | M8 6,5x13 | BRACKET 1 | M8x70 DIN912 DIN84 | M8 6,5x13 | BRACKET 1 | | | | |
| D40/9 + bracket | square | 38x38 40x40 | M8x50 DIN933 | | M8 6,5x13 | BRACKET 6 | M8x70 DIN933 | M8 6,5x13 | BRACKET 6 | M8x70 DIN933 | | M8 6,5x13 | BRACKET 6 |
| T7 | covered double covered | | M6x50 DIN7991 | M6 DIN125 | M6 DIN985 | M6x70 DIN7991 | M6 DIN125 | M6 DIN985 | | | | | |
| T9 | covered double covered | | M8x50 DIN7991 | M8 DIN125 | M8 DIN985 | M8x70 DIN7991 | M8 DIN125 | M8 DIN985 | | M8x90 DIN7991 | M8 DIN125 | M8 DIN985 | |
| 19T7 | mini micro | 19x19 13x13 8x8 | M6x50 DIN7991 | M6 DIN125 | M6 DIN985 | M6x70 DIN7991 | M6 DIN125 | M6 DIN985 | | | | | |
| 19T9 | mini micro | 19x19 13x13 8x8 | M8x50 DIN7991 | M8 DIN125 | M8 DIN985 | M8x70 DIN7991 | M8 DIN125 | M8 DIN985 | | M8x90 DIN7991 | M8 DIN125 | M8 DIN985 | |
| T50/9 + bracket | square | 50x50 | | | | | | | | M8x90 DIN7991 | | M8 6,5x13 | BRACKET 11 |
| 19T9 + bracket | mini | 19x19 | M8x50 DIN7991 | M8 6,5x13 | BRACKET 11 | M8x70 DIN7991 | M8 6,5x13 | BRACKET 11 | | M8x90 DIN7991 | | M8 6,5x13 | BRACKET 11 |
| | mini micro | 13x13 8x8 | M8x50 DIN7991 | M8 6,5x13 | BRACKET 6 | M8x70 DIN7991 | M8 6,5x13 | BRACKET 6 | | M8x90 DIN7991 | | | |

For mini mesh grating and single and double covered top gratings, it may be necessary to machine the grating to allow the housing of the clamp.

CONNECTION SYSTEMS

Used for connecting two adjacent panels to each other.



CONNECTION CLAMPS

| CLAMPS | GRATING THICKNESS |
|--------|-------------------|
| A25 | 25 mm |
| A28 | 28 mm |
| A1930 | 30 mm |
| A38 | 38 mm |
| A1940 | 40 mm |
| A1952 | 52 mm |

CONNECTION BAR

| CLAMPS | MESH | THICKNESS |
|----------------------|-------------|-----------|
| BAR + 2 Clamps D30/9 | rectangular | all |
| BAR + 2 Clamps D40/9 | square | all |
| BAR + 2 Clamps 19T9 | mini | all |

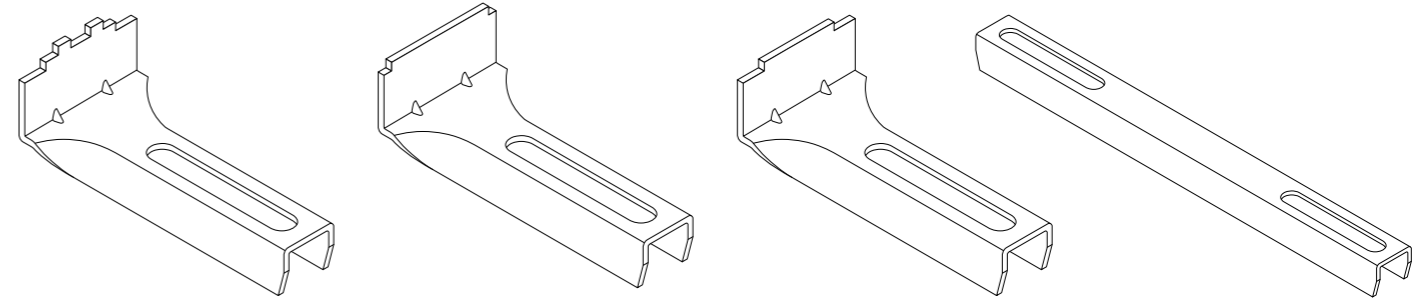
Connection clamps in AISI 316 stainless steel, supplied complete with bolt and welded nut. The clamp is used to connect two adjacent panels to each other. Screws as shown in table of page 44.

NUTS AND BOLTS FOR CONNECTING SYSTEMS

| CLAMP | MESH | GRATING THICKNESS 25 / 28 / 30 mm | | | | GRATING THICKNESS 38 / 40 mm | | | | GRATING THICKNESS 50 / 52 mm | | | |
|-------------|--|-----------------------------------|--------|-----------|----------|------------------------------|--------|-----------|----------|------------------------------|--------|-----------|----------|
| | | SCREW | WASHER | NUT | BRACKET | SCREW | WASHER | NUT | BRACKET | SCREW | WASHER | NUT | BRACKET |
| A25 | SCH38/25 | M6x30 | | | | | | | | | | | |
| A28 | SCH30/28 | M6x35 | | | | | | | | | | | |
| A38 | SCH30/38, SCH38/38 SCH40/38 | | | | | M6x50 | | | | | | | |
| A1930 | SCH38/30, SCH52/30 | M5x50 | | | | | | | | | | | |
| A1940 | SCH52/40 | | | | | | | | M5x50 | | | | |
| A1952 | SCH50/50, SCH52/52 | | | | | | | | | M5x70 | | | |
| BAR + D30/9 | SCH30/28, SCH30/38 SCH50/28 | M8x50 | | M8 6,5x13 | BAR C165 | M8x70 | | M8 6,5x13 | BAR C165 | M8x70 | | M8 6,5x13 | BAR C165 |
| | | DIN912 | | | | DIN912 | | | | DIN912 | | | |
| BAR + D40/9 | SCH38/15, SCH38/25 SCH38/30, SCH38/38 SCH40/30, SCH40/38 | M8x50 | | M8 6,5x13 | BAR C165 | M8x70 | | M8 6,5x13 | BAR 165 | M8x70 | | M8 6,5x13 | BAR C165 |
| | | DIN933 | | | | DIN933 | | | | DIN933 | | | |
| BAR + T9 | covered double covered | M8x50 | | M8 6,5x13 | BAR C165 | M8x70 | | M8 6,5x13 | BAR C165 | M8x90 | | M8 6,5x13 | BAR C165 |
| | | DIN7991 | | | | DIN7991 | | | | DIN7991 | | | |
| BAR + 19T9 | SCH52/30, SCH52/40 SCH52/52, SCH13/30 SCH13/38, SCH12/30 SCH12/38 | M8x50 | | M8 6,5x13 | BAR C165 | M8x70 | | M8 6,5x13 | BAR C165 | M8x90 | | M8 6,5x13 | BAR C165 |
| | | DIN7991 | | | | DIN7991 | | | | DIN7991 | | | |

For gratings with 8x8 and 13x13 mm mesh and for single and double covered top gratings, it may be necessary to machine the grating to allow the housing of the clamp .

BRACKETS



BRACKET 1

Rectangular mesh:

| |
|--------|
| 100x30 |
| 50x30 |

BRACKET 6

Main square mesh:

| |
|-------|
| 38x38 |
| 40x40 |

BRACKET 11

Main square mesh:

| |
|-------|
| 50x50 |
| 52x52 |

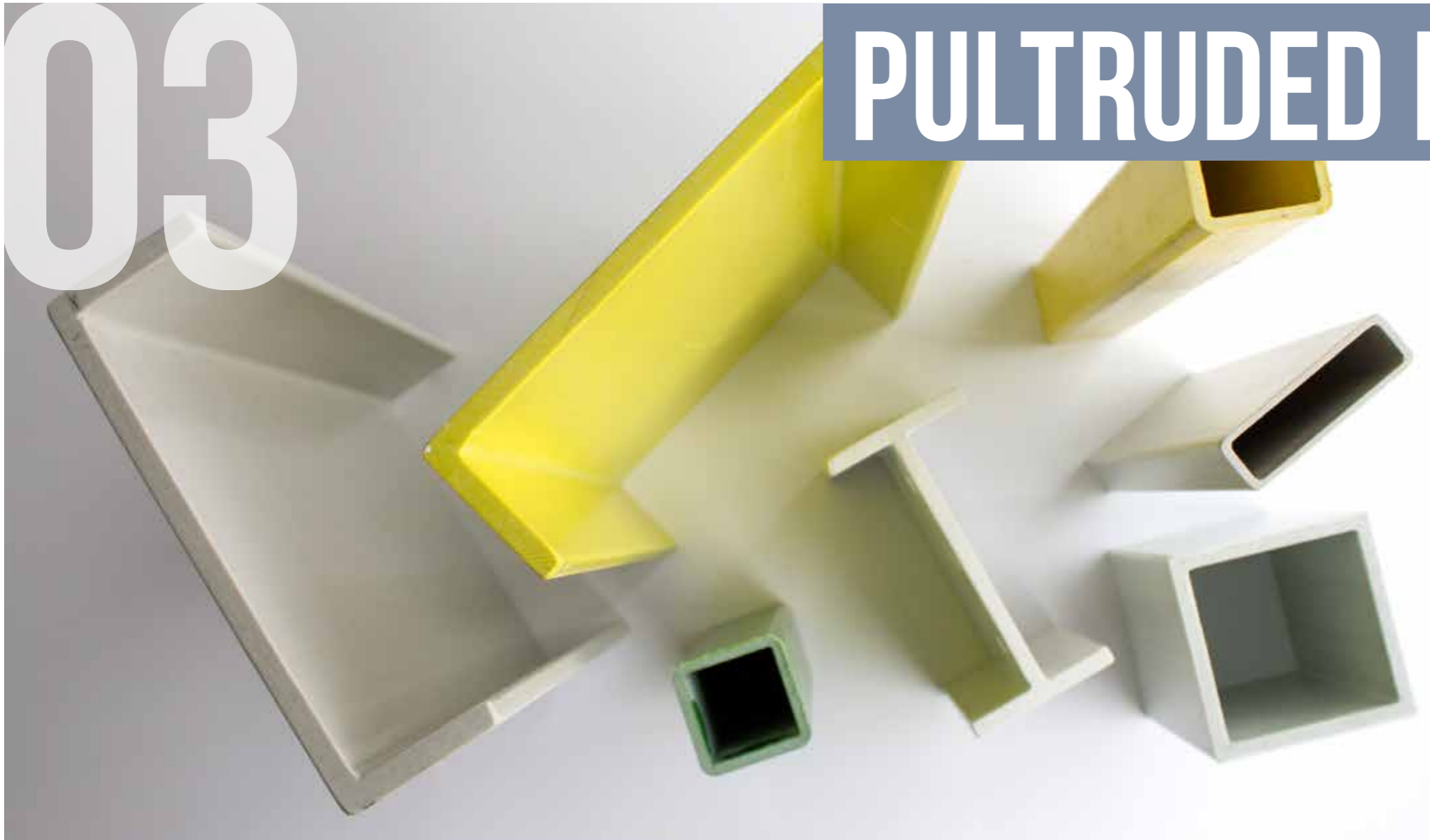
BAR C165

Mesh:

| |
|-----|
| All |
|-----|

03

PULTRUDED PROFILES



Profiles are obtained with the **pultrusion technology** which, by allowing to use a very high percentage of fibreglass, guarantees high mechanical performance.

Standard profiles are made of **isophthalic resin**. On request they can be produced using other resins to meet specific customer needs.

The standard colours are grey (RAL 7035) or yellow (RAL 1018).

All profiles are finished with a **polyester surface veil** which, since impregnated with a large quantity of resin, seals the profile surface, ensuring the protection from UV rays and atmospheric agents and preventing the emerging of glass fibres.

The high mechanical performance, lightness, ease of processing, resistance to chemical and atmospheric agents of the profiles, allow to create versatile and long lasting structures.

LIGHTWEIGHT

EASY TO WORK

EXCELLENT MECHANICAL STRENGTH/WEIGHT RATIO

PHYSICAL-MECHANICAL PROPERTIES

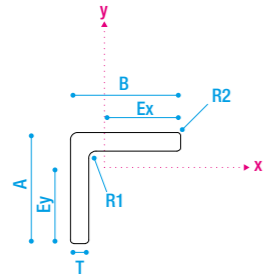
| PROPERTIES | REFERENCE STANDARD | UNIT | AVERAGE VALUE |
|-----------------------------------|--------------------|-------------------|---------------------|
| SPECIFIC WEIGHT | ASTM D792 | g/cm ³ | 1,75 - 1,90 |
| FIBREGLASS CONTENT IN WEIGHT | ASTM D2584 | % | 60,00 |
| GLASS TRANSITION TEMPERATURE | ISO 11357 | °C | 100 |
| THERMAL CONDUCTIVITY | EN 12667/ EN12664 | W/mK | 0,35 |
| THERMAL EXPANSION COEFFICIENT | ISO 11359-2 | k ⁻¹ | 11x10 ⁻⁶ |
| BENDING EFFECTIVE ELASTIC MODULUS | UNI EN 13706-2 | GPa | 22 - 30 |
| SHEAR EFFECTIVE ELASTIC MODULUS | UNI EN 13706-2 | GPa | 1,20 - 3,80 |
| LONGITUDINAL TENSILE STRENGTH | ASTM D638 | MPa | 300 - 500 |
| TRANSVERSAL TENSILE STRENGTH | ASTM D638 | MPa | 20 - 40 |
| LONGITUDINAL COMPRESSIVE STRENGTH | ASTM D695 | MPa | 180 - 300 |
| TRANSVERSAL COMPRESSIVE STRENGTH | ASTM D695 | MPa | 40 - 100 |
| LONGITUDINAL BENDING STRENGTH | ASTM D790 | MPa | 300 - 500 |

| PROPERTIES | REFERENCE STANDARD | UNIT | AVERAGE VALUE |
|---|--------------------|------|------------------|
| TRANSVERSAL BENDING STRENGTH | ASTM D790 | MPa | 40 - 100 |
| LONGITUDINAL INTERLAMINAR SHEAR STRENGTH | ASTM D2344 | MPa | 20 - 36 |
| TRANSVERSAL INTERLAMINAR SHEAR STRENGTH | ASTM D2344 | MPa | 5 - 10 |
| LONGITUDINAL PIN BEARING STRENGTH | ASTM D953 | MPa | 100 - 200 |
| TRANSVERSAL PIN BEARING STRENGTH | ASTM D953 | MPa | 30 - 70 |
| LONGITUDINAL TENSILE ELASTIC MODULUS | ASTM D638 | GPa | 22 - 30 |
| TRANSVERSAL TENSILE ELASTIC MODULUS | ASTM D638 | GPa | 5 - 10 |
| LONGITUDINAL COMPRESSIVE ELASTIC MODULUS | ASTM D695 | GPa | 16 - 21 |
| TRANSVERSAL COMPRESSIVE ELASTIC MODULUS | ASTM D695 | GPa | 5 - 9 |
| LONGITUDINAL POISSON RATIO | ASTM D638 | - | 0,28 |
| TRANSVERSAL POISSON RATIO | ASTM D638 | - | 0,12 |
| SUPERFICIAL AND TRANSVERSAL ELECTRICAL RESISTIVITY AND RESISTANCE | EN 61340 | Ω | 10 ¹² |

The values refer to tests made on various thicknesses and resin types. The values are reliable, but M.M. accepts no responsibility for their use. For further information and support in relation to the use of values for design purposes, please contact M.M. offices.

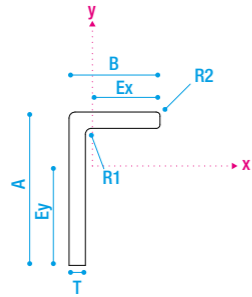
ANGULAR PROFILE "A"

1. ANGULAR PROFILE WITH EQUAL SIDES



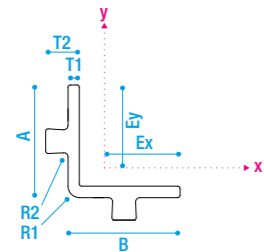
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-----------|-------|-------|------|------|------|---------------------|----------|-------------------------|-------------------------|-----------------------|-----------------------|-------------------|---------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53A30305I | 30 mm | 30 mm | 5 mm | 2 mm | 1 mm | 274 mm ² | 0,4 kg/m | 21.907 mm ⁴ | 21.907 mm ⁴ | 1.059 mm ³ | 1.059 mm ³ | 20,7 mm | 20,7 mm |
| 53A35355I | 35 mm | 35 mm | 5 mm | 2 mm | 2 mm | 321 mm ² | 0,5 kg/m | 35.176 mm ⁴ | 35.176 mm ⁴ | 1.440 mm ³ | 1.440 mm ³ | 24,4 mm | 24,4 mm |
| 53A40405I | 40 mm | 40 mm | 5 mm | 2 mm | 2 mm | 371 mm ² | 0,6 kg/m | 54.059 mm ⁴ | 54.059 mm ⁴ | 1.919 mm ³ | 1.919 mm ³ | 28,2 mm | 28,2 mm |
| 53A45455I | 45 mm | 45 mm | 5 mm | 2 mm | 2 mm | 421 mm ² | 0,7 kg/m | 78.749 mm ⁴ | 78.749 mm ⁴ | 2.469 mm ³ | 2.469 mm ³ | 31,9 mm | 31,9 mm |
| 53A50505I | 50 mm | 50 mm | 5 mm | 2 mm | 2 mm | 471 mm ² | 0,8 kg/m | 110.025 mm ⁴ | 110.025 mm ⁴ | 3.085 mm ³ | 3.085 mm ³ | 35,7 mm | 35,7 mm |
| 53A60605I | 60 mm | 60 mm | 5 mm | 2 mm | 2 mm | 571 mm ² | 1,0 kg/m | 195.463 mm ⁴ | 195.463 mm ⁴ | 4.535 mm ³ | 4.535 mm ³ | 43,1 mm | 43,1 mm |

2. ANGULAR PROFILE WITH UNEQUAL SIDES



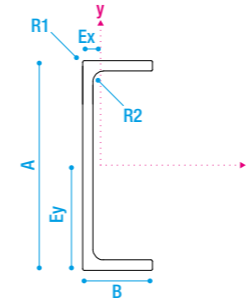
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|--------------|--------|--------|-------|-------|------|-----------------------|----------|---------------------------|---------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53A45358I | 45 mm | 35 mm | 8 mm | 3 mm | 2 mm | 574 mm ² | 1,0 kg/m | 107.515 mm ⁴ | 55.214 mm ⁴ | 3.652 mm ³ | 2.259 mm ³ | 24,4 mm | 29,4 mm |
| 53A75458I | 75 mm | 45 mm | 8 mm | 3 mm | 2 mm | 894 mm ² | 1,6 kg/m | 503.712 mm ⁴ | 135.220 mm ⁴ | 10.371 mm ³ | 4.029 mm ³ | 33,6 mm | 48,6 mm |
| 53A1006010I | 100 mm | 60 mm | 10 mm | 3 mm | 2 mm | 1.498 mm ² | 2,7 kg/m | 1.509.782 mm ⁴ | 408.729 mm ⁴ | 23.227 mm ³ | 9.083 mm ³ | 45,0 mm | 65,0 mm |
| 53A15010015I | 150 mm | 100 mm | 15 mm | 15 mm | 2 mm | 3.570 mm ² | 6,2 kg/m | 7.992.598 mm ⁴ | 2.836.683 mm ⁴ | 80.086 mm ³ | 38.076 mm ³ | 74,5 mm | 99,8 mm |

3. SELF-ANCHORING ANGULAR PROFILE



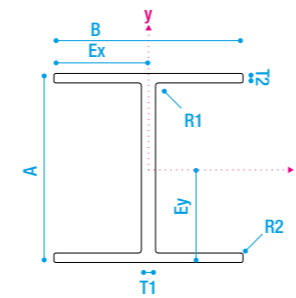
| CODE | A | B | T1 | T2 | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|-------|-------|------|-------|--------|--------|---------------------|----------|-------------------------|-------------------------|-----------------------|-----------------------|-------------------|---------|
| | | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53AW50505I | 50 mm | 50 mm | 5 mm | 15 mm | 1-5 mm | 1-2 mm | 681 mm ² | 1,2 kg/m | 163.610 mm ⁴ | 163.610 mm ⁴ | 4.434 mm ³ | 4.434 mm ³ | 36,9 mm | 36,9 mm |

"C" PROFILE



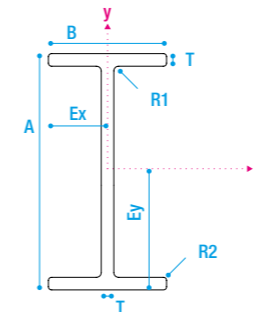
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|--------------|--------|--------|-------|------|-------|-----------------------|-----------|----------------------------|---------------------------|-------------------------|------------------------|-------------------|----------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53C60505I | 60 mm | 50 mm | 5 mm | 2 mm | 7 mm | 729 mm ² | 1,3 kg/m | 413.772 mm ⁴ | 181.848 mm ⁴ | 13.792 mm ³ | 5.595 mm ³ | 17,5 mm | 30,0 mm |
| 53C90358I | 90 mm | 35 mm | 8 mm | 3 mm | 3 mm | 1.149 mm ² | 2,1 kg/m | 1.206.187 mm ⁴ | 110.428 mm ⁴ | 26.804 mm ³ | 4.519 mm ³ | 10,6 mm | 45,0 mm |
| 53C150458I | 150 mm | 45 mm | 8 mm | 3 mm | 3 mm | 1.789 mm ² | 3,2 kg/m | 5.215.729 mm ⁴ | 270.440 mm ⁴ | 69.543 mm ³ | 8.057 mm ³ | 11,4 mm | 75,0 mm |
| 53C2006010I | 200 mm | 60 mm | 10 mm | 3 mm | 3 mm | 2.996 mm ² | 5,3 kg/m | 15.661.652 mm ⁴ | 817.458 mm ⁴ | 156.617 mm ³ | 18.166 mm ³ | 15,0 mm | 100,0 mm |
| 53C30010015I | 300 mm | 100 mm | 15 mm | 3 mm | 15 mm | 7.139 mm ² | 12,5 kg/m | 87.097.204 mm ⁴ | 5.673.366 mm ⁴ | 580.648 mm ³ | 76.255 mm ³ | 25,6 mm | 150,0 mm |

"H" PROFILE



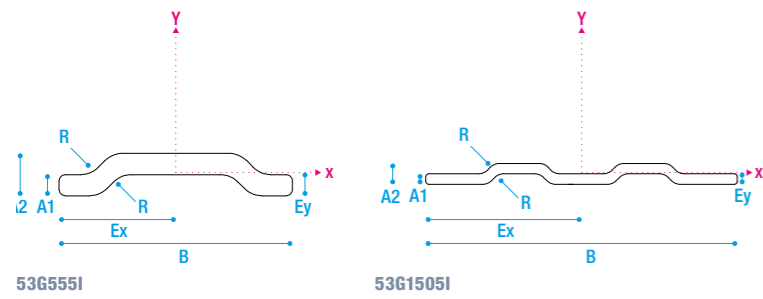
| CODE | A | B | T1 | T2 | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|--------------|--------|--------|-------|-------|------|------|-----------------------|-----------|----------------------------|----------------------------|-------------------------|-------------------------|-------------------|--------|
| | | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53H20020015I | 200 mm | 200 mm | 15 mm | 10 mm | 3 mm | 2 mm | 6.701 mm ² | 12,3 kg/m | 43.422.865 mm ⁴ | 13.316.415 mm ⁴ | 434.229 mm ³ | 133.164 mm ³ | 100 mm | 100 mm |

"I" PROFILE



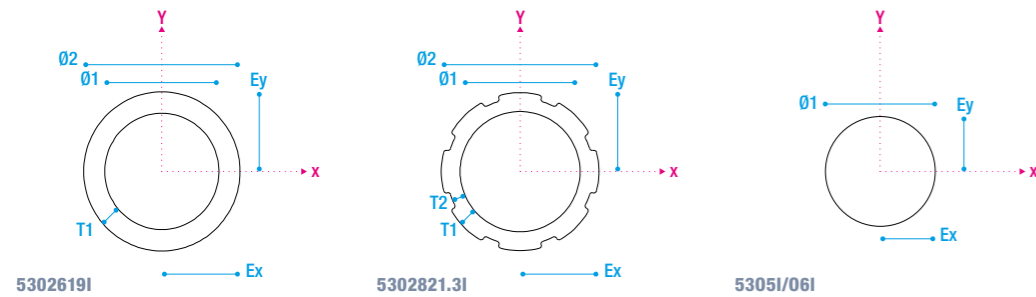
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|--------------|--------|--------|-------|------|------|-----------------------|----------|----------------------------|---------------------------|-------------------------|------------------------|-------------------|----------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53I150758I | 150 mm | 75 mm | 8 mm | 3 mm | 2 mm | 2.273 mm ² | 4,1 kg/m | 7.658.956 mm ⁴ | 558.958 mm ⁴ | 102.119 mm ³ | 14.906 mm ³ | 37,5 mm | 75 mm |
| 53I20010010I | 200 mm | 100 mm | 10 mm | 3 mm | 2 mm | 3.801 mm ² | 6,5 kg/m | 22.926.198 mm ⁴ | 1.665.053 mm ⁴ | 229.262 mm ³ | 33.301 mm ³ | 50,0 mm | 100,0 mm |

“SHAPED” PROFILE



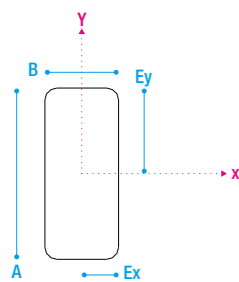
| CODE | A1 | A2 | B | R | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|----------|------|-------|--------|------|---------------------|----------|-----------------------|---------------------------|-----------------------|------------------------|-------------------|--------|
| | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53G555I | 5 mm | 10 mm | 55 mm | 6 mm | 294 mm ² | 0,5 kg/m | 2.101 mm ⁴ | 73.596 mm ⁴ | 383 mm ³ | 2.676 mm ³ | 27,5 mm | 5,5 mm |
| 53G1505I | 5 mm | 10 mm | 150 mm | 6 mm | 789 mm ² | 1,3 kg/m | 5.686 mm ⁴ | 1.440.519 mm ⁴ | 1.006 mm ³ | 19.207 mm ³ | 75,0 mm | 4,3 mm |

“TUBULAR” PROFILE



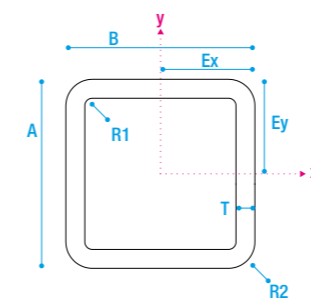
| CODE | Ø1 | Ø2 | T1 | T2 | DEPTH EFFECT | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|---------|---------|--------|--------|--------------|-----------------------|------------|------------------------|------------------------|-----------------------|-----------------------|-------------------|---------|
| | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 5302619I | 19 mm | 25,4 mm | 3,2 mm | | | 247 mm ² | 0,6 kg/m | 16.034 mm ⁴ | 16.034 mm ⁴ | 1.263 mm ³ | 1.263 mm ³ | 12,7 mm | 12,7 mm |
| 5302821.3I | 21,3 mm | 28 mm | 3,3 mm | 2,5 mm | 2 mm | 235,5 mm ² | 0,4 kg/m | 17.874 mm ⁴ | 17.874 mm ⁴ | 1.277 mm ³ | 1.277 mm ³ | 14,0 mm | 14,0 mm |
| 5305I | 5 mm | | | | | 19 mm ² | 0,025 kg/m | 31 mm ⁴ | 31 mm ⁴ | 12 mm ³ | 12 mm ³ | 2,5 mm | 2,5 mm |
| 5306I | 6 mm | | | | | 28 mm ² | 0,04 kg/m | 63 mm ⁴ | 63 mm ⁴ | 21 mm ³ | 21 mm ³ | 3 mm | 3 mm |

FLAT “P” PROFILE



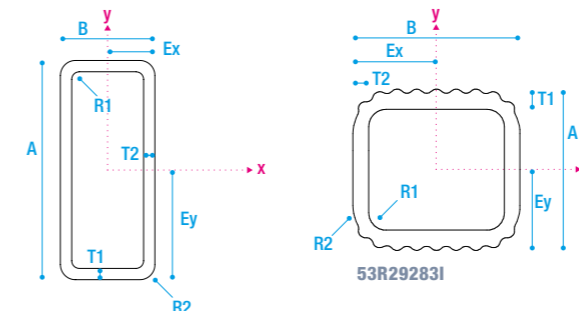
| CODE | A | B | R | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|----------|-------|-------|--------|-----------------------|----------|-------------------------|------------------------|------------------------|-----------------------|-------------------|---------|
| | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53P5825I | 58 mm | 25 mm | 4 mm | 1.436 mm ² | 2,8 kg/m | 395.625 mm ⁴ | 73.662 mm ⁴ | 13.642 mm ³ | 5.893 mm ³ | 12,5 mm | 29,0 mm |
| 53P405I | 40 mm | 5 mm | 1,5 mm | 198 mm ² | 0,3 kg/m | 25.919 mm ⁴ | 407 mm ⁴ | 1.296 mm ³ | 163 mm ³ | 2,5 mm | 20,0 mm |

SQUARE “Q” PROFILE



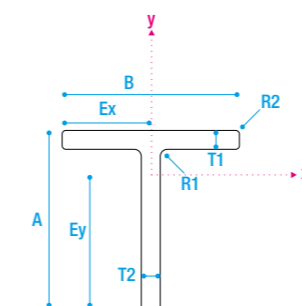
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-------------|--------|--------|------|------|------|------------------------|----------|---------------------------|---------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53Q50505I | 50 mm | 50 mm | 5 mm | 2 mm | 7 mm | 861,37 mm ² | 1,5 kg/m | 285.637 mm ⁴ | 285.637 mm ⁴ | 11.426 mm ³ | 11.426 mm ³ | 25,0 mm | 25,0 mm |
| 53Q90908I | 90 mm | 90 mm | 8 mm | 2 mm | 4 mm | 2.614 mm ² | 4,8 kg/m | 2.946.480 mm ⁴ | 2.946.480 mm ⁴ | 65.477 mm ³ | 65.477 mm ³ | 45,0 mm | 45,0 mm |
| 53Q1001008I | 100 mm | 100 mm | 8 mm | 1 mm | 2 mm | 2.941 mm ² | 5,4 kg/m | 4.177.471 mm ⁴ | 4.177.471 mm ⁴ | 83.549 mm ³ | 83.549 mm ³ | 50,0 mm | 50,0 mm |

RECTANGULAR “R” PROFILE



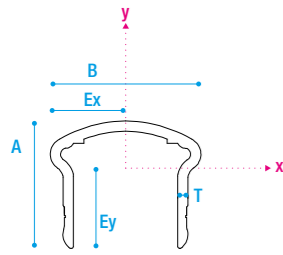
| CODE | A | B | T1 | T2 | DEPTH EFFECT | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-----------|-------|-------|--------|--------|--------------|------|------|------------------------|-----------|-------------------------|-------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53R58253I | 58 mm | 25 mm | 3 mm | 3 mm | | 2 mm | 4 mm | 451 mm ² | 0,8 kg/m | 175.239 mm ⁴ | 44.223 mm ⁴ | 6.043 mm ³ | 3.538 mm ³ | 12,5 mm | 29,0 mm |
| 53R80505I | 80 mm | 50 mm | 5 mm | 5 mm | | 2 mm | 4 mm | 1.189 mm ² | 2,0 kg/m | 973.087 mm ⁴ | 453.324 mm ⁴ | 24.327 mm ³ | 18.134 mm ³ | 25,0 mm | 40,0 mm |
| 53R85253I | 85 mm | 25 mm | 4 mm | 3 mm | | 3 mm | 4 mm | 656 mm ² | 1,1 kg/m | 543.858 mm ⁴ | 65.412 mm ⁴ | 12.797 mm ³ | 5.233 mm ³ | 12,5 mm | 42,5 mm |
| 53R29283I | 28 mm | 29 mm | 3,5 mm | 2,7 mm | 0,8 mm | 3 mm | 7 mm | 262,20 mm ² | 0,46 kg/m | 25.398 mm ⁴ | 26.151 mm ⁴ | 1.827 mm ³ | 1.803 mm ³ | 14,5 mm | 13,9 mm |

“T” PROFILE



| CODE | A | B | T1 | T2 | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|--------------|--------|--------|-------|-------|------|------|-----------------------|----------|---------------------------|---------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53T75758I | 75 mm | 75 mm | 8 mm | 8 mm | 3 mm | 2 mm | 1.136 mm ² | 2 kg/m | 601.353 mm ⁴ | 279.479 mm ⁴ | 11.282 mm ³ | 7.453 mm ³ | 37,5 mm | 53,3 mm |
| 53T10010010I | 100 mm | 100 mm | 10 mm | 10 mm | 3 mm | 2 mm | 1.900 mm ² | 3,4 kg/m | 1.799.300 mm ⁴ | 832.527 mm ⁴ | 25.236 mm ³ | 16.650 mm ³ | 50,0 mm | 71,3 mm |
| 53T20010015I | 100 mm | 200 mm | 10 mm | 15 mm | 3 mm | 2 mm | 3.350 mm ² | 6,1 kg/m | 2.942.187 mm ⁴ | 6.658.207 mm ⁴ | 39.281 mm ³ | 66.582 mm ³ | 100,0 mm | 74,9 mm |

ERGONOMIC PROFILE



| CODE | A | B | T | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-----------|-------|-------|------|---------------------|----------|-------------------------|-------------------------|-----------------------|------------------------|-------------------|---------|
| | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53C606051 | 60 mm | 60 mm | 5 mm | 845 mm ² | 1,2 kg/m | 278.214 mm ⁴ | 539.396 mm ⁴ | 7.134 mm ³ | 14.983 mm ³ | 36,2 mm | 39,0 mm |

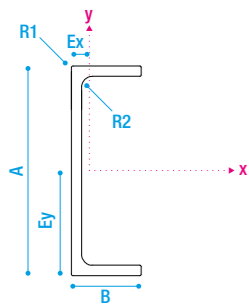
E23 LINE PROFILES (EN13706)

M.M. offers a line of profiles classified as E23 according to EN 13706 standard. This standard defines some minimum requirements that must be met by the profiles in order to achieving a univocal classification for pultruded profiles. The E23 class profiles are produced with a RAL 1018 yellow colour.

| MECHANICAL PROPERTIES | SYMBOL | VALUE | TEST METHOD |
|--------------------------------------|-----------|---------|--------------------|
| BENDING EFFECTIVE ELASTIC MODULUS | E_{eff} | GPa 23 | Annex D EN 13706-2 |
| LONGITUDINAL TENSILE ELASTIC MODULUS | E_{lt} | GPa 23 | EN ISO 527-4 |
| TRANSVERSAL TENSILE ELASTIC MODULUS | E_{tt} | GPa 7 | EN ISO 527-4 |
| LONGITUDINAL TENSILE STRENGTH | f_{lt} | MPa 240 | EN ISO 527-4 |
| TRANSVERSAL TENSILE STRENGTH | f_{tt} | MPa 50 | EN ISO 527-4 |
| LONGITUDINAL PIN BEARING STRENGTH | f_{lr} | MPa 150 | Annex E EN 13706-2 |
| TRANSVERSAL PIN BEARING STRENGTH | f_{tr} | MPa 70 | Annex E EN 13706-2 |
| LONGITUDINAL BENDING STRENGTH | f_{lr} | MPa 240 | EN ISO 14125 |
| TRANSVERSAL BENDING STRENGTH | f_{tr} | MPa 100 | EN ISO 14125 |
| SHEAR STRENGTH | f_v | MPa 25 | EN ISO 14130 |

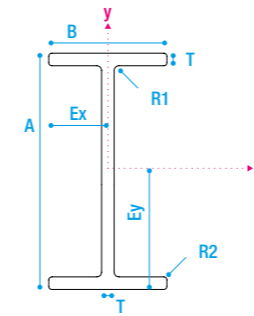
Dimensional tolerances according to EN 13706-2 standard annex b

"C" PROFILE



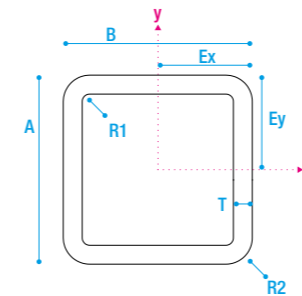
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|--------|--------|-------|------|-------|--------------------------|-----------|----------------------------|---------------------------|----------------------------|------------------------|-------------------|----------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53C0003E23 | 60 mm | 50 mm | 5 mm | 2 mm | 7 mm | 729 mm ² | 1,3 kg/m | 413.772 mm ⁴ | 181.848 mm ⁴ | 13.792 mm ³ | 5.595 mm ³ | 17,5 mm | 30,0 mm |
| 53C0002E23 | 300 mm | 100 mm | 15 mm | 3 mm | 15 mm | 7.139 mm ² | 12,5 kg/m | 87.097.204 mm ⁴ | 5.673.366 mm ⁴ | 580.648 mm ³ | 76.255 mm ³ | 25,6 mm | 150,0 mm |
| 53C0001E23 | 200 mm | 50 mm | 10 mm | 6 mm | 4 mm | 2.791,42 mm ² | 4,9 kg/m | 13.797.444 mm ⁴ | 478.659 mm ⁴ | 137.974,44 mm ³ | 12.633 mm ³ | 12,1 mm | 100,0 mm |

"I" PROFILE



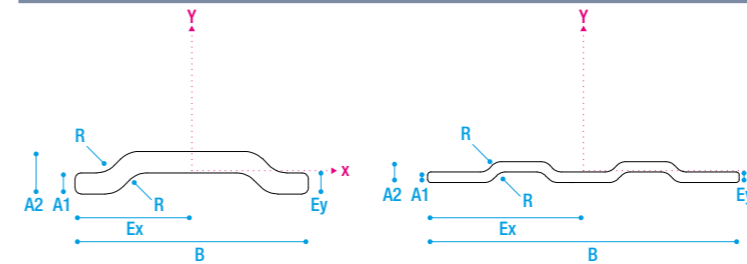
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|--------|--------|-------|------|------|-----------------------|----------|----------------------------|---------------------------|-------------------------|------------------------|-------------------|----------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53I0001E23 | 203 mm | 101 mm | 10 mm | 3 mm | 2 mm | 3.801 mm ² | 6,5 kg/m | 22.926.198 mm ⁴ | 1.655.053 mm ⁴ | 229.262 mm ³ | 33.301 mm ³ | 50,0 mm | 100,0 mm |

SQUARE "Q" PROFILE



| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|--------|--------|------|------|------|------------------------|----------|---------------------------|---------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53Q0001E23 | 100 mm | 100 mm | 8 mm | 1 mm | 2 mm | 2.941 mm ² | 5,4 kg/m | 4.177.471 mm ⁴ | 4.177.471 mm ⁴ | 83.549 mm ³ | 83.549 mm ³ | 50,0 mm | 50,0 mm |
| 53Q0003E23 | 50 mm | 50 mm | 5 mm | 2 mm | 7 mm | 861,37 mm ² | 1,5 kg/m | 285.637 mm ⁴ | 285.637 mm ⁴ | 11.426 mm ³ | 11.426 mm ³ | 25,0 mm | 25,0 mm |

"SHAPED" PROFILE



| CODE | A1 | A2 | B | R | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|------|-------|--------|------|---------------------|----------|-----------------------|---------------------------|-----------------------|------------------------|-------------------|--------|
| | | | | | | | J _x | J _y | W _x | W _y | Ex | Ey |
| 53G0001E23 | 5 mm | 10 mm | 150 mm | 6 mm | 789 mm | 1,3 kg/m | 5.686 mm ⁴ | 1.440.519 mm ⁴ | 1.006 mm ³ | 19.207 mm ³ | 75,0 mm | 4,3 mm |
| 53G0002E23 | 5 mm | 10 mm | 55 mm | 6 mm | 294 mm ² | 0,5 kg/m | 2.101 mm ⁴ | 73.596 mm ⁴ | 383 mm ³ | 2.676 mm ³ | 27,5 mm | 5,5 mm |

ACS POTABLE WATER LINE PROFILES

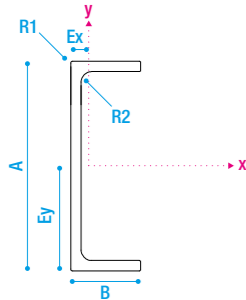


M.M. offers a special line of profiles produced with raw materials included in the positive list of **EU Regulation 10/2011** and registered by the French General Health Department with the Sanitary Conformity Certification (ACS), **suitable for contact with drinking water** as authorized by the Italian Ministry of Health.

These profiles can be used to build structures (walkways, stairways, handrail systems) in all areas and situations in direct contact with drinking water.

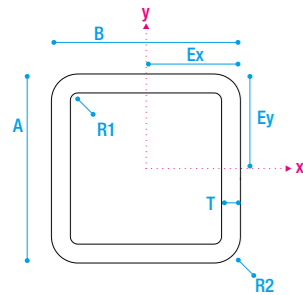
Profiles certified for contact with drinking water are produced in grey RAL 7035 with red filigree.

“C” PROFILE



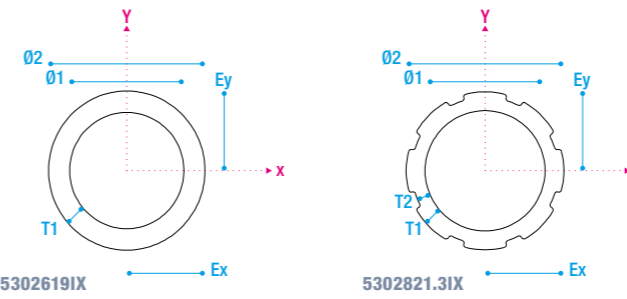
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|---------------|--------|--------|-------|------|-------|-----------------------|-----------|----------------------------|---------------------------|-------------------------|------------------------|-------------------|----------|
| | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53C605051X | 60 mm | 50 mm | 5 mm | 2 mm | 7 mm | 729 mm ² | 1,3 kg/m | 413.772 mm ⁴ | 181.848 mm ⁴ | 13.792 mm ³ | 5.595 mm ³ | 17,5 mm | 30,0 mm |
| 53C903581X | 90 mm | 35 mm | 8 mm | 3 mm | 3 mm | 1.149 mm ² | 2,1 kg/m | 1.206.187 mm ⁴ | 110.428 mm ⁴ | 26.804 mm ³ | 4.519 mm ³ | 10,6 mm | 45,0 mm |
| 53C300100151X | 300 mm | 100 mm | 15 mm | 3 mm | 15 mm | 7.139 mm ² | 12,5 kg/m | 87.097.204 mm ⁴ | 5.673.366 mm ⁴ | 580.648 mm ³ | 76.255 mm ³ | 25,6 mm | 150,0 mm |

SQUARE “Q” PROFILE



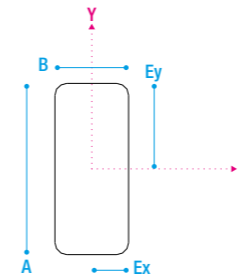
| CODE | A | B | T | R1 | R2 | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|------------|-------|-------|------|------|------|------------------------|----------|-------------------------|-------------------------|------------------------|------------------------|-------------------|---------|
| | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53Q505051X | 50 mm | 50 mm | 5 mm | 2 mm | 7 mm | 861,37 mm ² | 1,5 kg/m | 285.637 mm ⁴ | 285.637 mm ⁴ | 11.426 mm ³ | 11.426 mm ³ | 25,0 mm | 25,0 mm |

“TUBULAR” PROFILE



| CODE | Ø1 | Ø2 | T1 | T2 | DEPTH EFFECT | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-------------|---------|---------|--------|--------|--------------|-----------------------|----------|------------------------|------------------------|-----------------------|-----------------------|-------------------|---------|
| | | | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53026191X | 19 mm | 25,4 mm | 3,2 mm | | | 247 mm ² | 0,6 kg/m | 16.034 mm ⁴ | 16.034 mm ⁴ | 1.263 mm ³ | 1.263 mm ³ | 12,7 mm | 12,7 mm |
| 5302821.31X | 21,3 mm | 28 mm | 3,3 mm | 2,5 mm | 2 mm | 235,5 mm ² | 0,4 kg/m | 17.874 mm ⁴ | 17.874 mm ⁴ | 1.277 mm ³ | 1.277 mm ³ | 14,0 mm | 14,0 mm |

FLAT “P” PROFILE



| CODE | A | B | R | AREA | WEIGHT | MOMENT OF INERTIA | | STRENGTH MODULUS | | CENTRE OF GRAVITY | |
|-----------|-------|-------|--------|-----------------------|----------|-------------------------|------------------------|------------------------|-----------------------|-------------------|---------|
| | | | | | | Jx | Jy | Wx | Wy | Ex | Ey |
| 53P58251X | 58 mm | 25 mm | 4 mm | 1.436 mm ² | 2,8 kg/m | 395.625 mm ⁴ | 73.662 mm ⁴ | 13.642 mm ³ | 5.893 mm ³ | 12,5 mm | 29,0 mm |
| 53P5041X | 50 mm | 4 mm | 1,5 mm | 198 mm ² | 0,3 kg/m | 40.492 mm ⁴ | 261 mm ⁴ | 1.620 mm ³ | 130 mm ³ | 2,0 mm | 25,0 mm |



The handrail systems are made with pultruded profiles in isophthalic polyester resin and fibreglass.

The handrail systems, supplied with **vertical or horizontal fixing**, are designed and manufactured according to UNI EN ISO 14122-3 standard and are available in **standard or ergonomic versions**.

The ergonomic handrail differs from the standard handrail for its ergonomic C profile and for the knee rail designed with a tubular profile (not shaped as in the standard version).

The connections between the elements are achieved with rivets and steel bolts. To make simple and quick the assembly of handrail systems, a **series of accessories has been developed to facilitate installation**.

All handrails are supplied in **standard grey (RAL 7035) or yellow (RAL 1018)**.

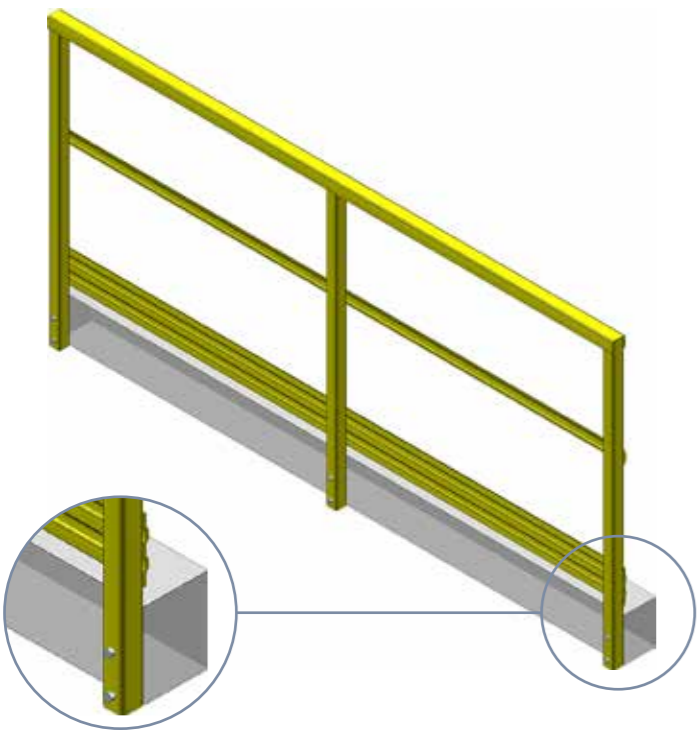
On request, they are available in other colours and resins.

EASY TO INSTALL

ERGONOMIC HANDRAIL SYSTEMS

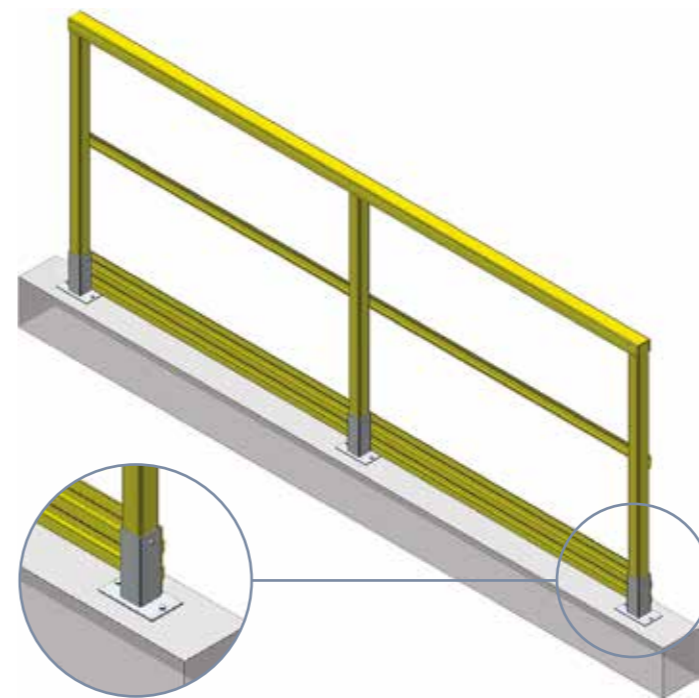
SAFETY ON WORKING AREAS

STANDARD HANDRAIL SYSTEMS



VERTICAL FIXING

| CODE | PVST01 | |
|-----------------------------|-------------------|--------------|
| HANDRAIL | "C" type profile | 60x50x5 mm |
| STANCHION | "Square" profile | 50x50x5 mm |
| KNEERAIL | "Shaped" profile | 55x5 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| REINFORCEMENT FOR STANCHION | tubular polyamide | 40x40x130 mm |



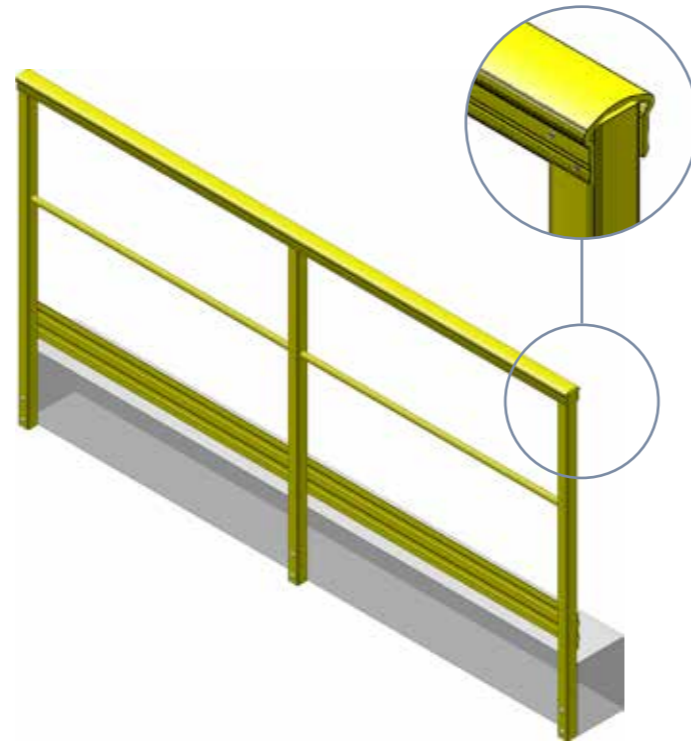
HORIZONTAL FIXING

| CODE | POST01 | |
|----------------------------|-----------------------|--|
| HANDRAIL | "C" type profile | 60x50x5 mm |
| STANCHION | "Square" profile | 50x50x5 mm |
| KNEERAIL | "Shaped" profile | 55x5 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| FIXING FOR PLATE BASE UNIT | stainless steel plate | base 140x80 mm housing 50x50x155 mm |

ERGONOMIC HANDRAIL SYSTEM

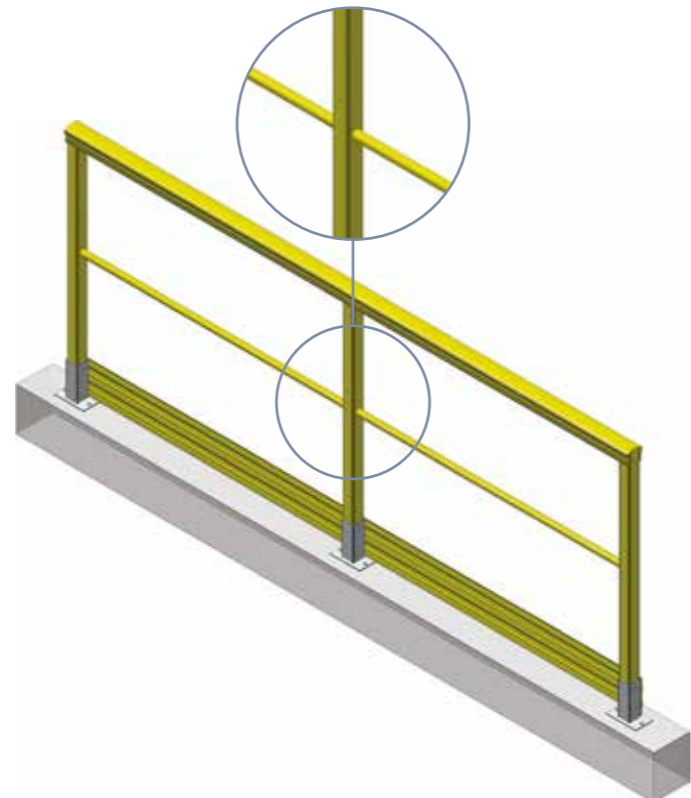
VERTICAL FIXING

| CODE | PVERG01 | |
|-----------------------------|-------------------|--------------|
| HANDRAIL | ergonomic profile | 60x60x5 mm |
| STANCHION | "Square" profile | 50x50x5 mm |
| KNEERAIL | "Tubular" profile | Ø 26x19 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| REINFORCEMENT FOR STANCHION | polyamide tubular | 40x40x130 mm |



HORIZONTAL FIXING

| CODE | POERG01 | |
|-------------------------------|-----------------------|--|
| HANDRAIL | ergonomic profile | 60x60x5 mm |
| STANCHION | "Square" profile | 50x50x5 mm |
| KNEERAIL | "Tubular" profile | Ø 26x19 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| FIXING FOR PLATE BASE UNIT | stainless steel plate | base 140x80 mm housing 50x50x155 mm |



ACCESSORIES FOR HANDRAIL SYSTEMS

ARTICULATED JOINTS



ADJUSTABLE JOINT FOR HANDRAIL

| | |
|----------|----------------|
| CODE | 58PA66SCE17035 |
| MATERIAL | plastic |
| WEIGHT | 180 g |
| COLOUR | grey |



ADJUSTABLE JOINT FOR KNEERAIL

| | |
|----------|---------------|
| CODE | 58PA66ST17035 |
| MATERIAL | plastic |
| WEIGHT | 40 g |
| COLOUR | grey |

CAPS



TUBE END CAP

| | |
|----------|---------------|
| CODE | 58PA66TT17035 |
| MATERIAL | plastic |
| WEIGHT | 15 g |
| COLOUR | grey |



ERGONOMIC HANDRAIL CAP

| | |
|----------|----------------|
| CODE | 58PA66TCE17035 |
| MATERIAL | plastic |
| WEIGHT | 30 g |
| COLOUR | grey |

REINFORCEMENTS AND PLATES



STANCHION REINFORCEMENT

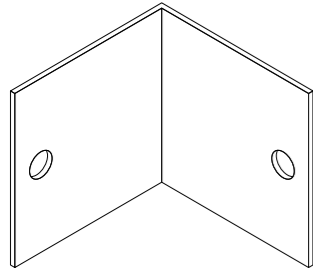
| | |
|----------|-----------------|
| CODE | 58PA66IFPQ50505 |
| MATERIAL | polyamide |
| WEIGHT | 130 g |
| COLOUR | black |



FIXING PLATE FOR BASE UNIT (STANCHION)

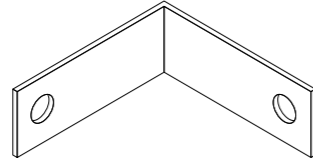
| | |
|----------|--|
| CODE | 56ASTAFFA8 |
| MATERIAL | stainless steel |
| WEIGHT | 850 g |
| COLOUR | base 140x80 mm housing 50x50x155 mm |

JOINTS



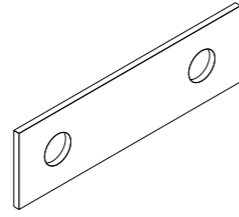
90° joint for handrail
available also for angles ≠ 90°

| | |
|-----------|-----------------|
| CODE | 56A404012 |
| MATERIAL | stainless steel |
| SIZE | 40x40x40 mm |
| THICKNESS | 1,2 mm thick |



90° joint for shaped profile
available also for angles ≠ 90°

| | |
|-----------|-----------------|
| CODE | 56A40401512 |
| MATERIAL | stainless steel |
| SIZE | 40x40x15 mm |
| THICKNESS | 1,2 mm thick |



Linear joint for shaped profile

| | |
|-----------|-----------------|
| CODE | 56P501512 |
| MATERIAL | stainless steel |
| SIZE | 50x15 mm |
| THICKNESS | 1,2 mm thick |

VERIFICATION OF COMPLIANCE WITH EN ISO 14122-3:2010

In order to guarantee the maximum safety of our products, the handrail systems with both horizontal and vertical fixing were subjected to tests verifying compliance with EN ISO 14122-3:2010 requirements. The results of these tests have been certified by Bureau Veritas.

Industry & Facilities Division Page: 1 / 8
 Interim
 Final

INSPECTION CERTIFICATE No. 1915202/PAD/IC/02
 BV Job nr: 14.IT.1915202.139 Chrono No. P6457/14/EB/eb

PROJECT: // Ref.: //
 BV Client: M.M. srl Via A. Zanussi 300/302, 33100 Udine (Italy) P/o No.: 484 dated 24 Nov. 2014
 Manufacturer: M.M. srl Via A. Zanussi 300/302, 33100 Udine (Italy) Ref. No.: N.A.
 Inspection requested by: M.M. srl.

| SUPPLY / SUBJECT OF INSPECTION | ITEM / TAG Nr | QTY |
|--|---------------|-----|
| FRP GUARDRAIL HANDRAIL type "PVSTO1" and "PVERGO1" VERTICAL FIXING, WITH POLYAMIDE GRAFT | 01 | 1 |

Scope of inspection:

- Particulars: see next page(s);
- Reference documents used for inspection: UNI EN ISO 14122-3:2010; NF E85-015. SAFETY OF MACHINERY-PERMANENT MEANS OF ACCESS TO MACHINERY: Part 3: Stairs, steploaders and guard-rails.
- Place of inspection & date or period: Udine's industrial area (UD) Italy, 1st December 2014
- Annexes to this certificate: None

The undersigned, inspector to Bureau Veritas, certifies that the hereabove mentioned supply was inspected in conformity with the applicable requirements of the purchase order and the contractual requirements governing the mission entrusted to Bureau Veritas without any remarks.

Inspected by: Name: Edi BULFO Signature: 
 Checked by: Name: Fabio ALFINE Signature: 

Date of issue : 01 DEC. 2014
 Revision date: until 30 NOV. 2015
 Inspection centre: BV PADUA - NORTH EAST AREA - ITALY

INSP 005 En GM SI 101 1/8 Copyright Bureau Veritas 04/2011

Industry & Facilities Division Page: 1 / 8
 Interim
 Final

INSPECTION CERTIFICATE No. 1915202/PAD/IC/01
 BV Job nr: 14.IT.1915202.139 Chrono No. P6447/14/EB/eb

PROJECT: // Ref.: //
 BV Client: M.M. srl Via A. Zanussi 300/302, 33100 Udine (Italy) P/o No.: 484 dated 24 Nov. 2014
 Manufacturer: M.M. srl Via A. Zanussi 300/302, 33100 Udine (Italy) Ref. No.: N.A.
 Inspection requested by: M.M. srl.

| SUPPLY / SUBJECT OF INSPECTION | ITEM / TAG Nr | QTY |
|--|---------------|-----|
| FRP GUARDRAIL HANDRAIL type "POSTO1" and "POERGO1" HORIZONTAL FIXING, WITH STAINLESS STEEL BRACKET | 01 | 1 |

Scope of inspection:

- Particulars: see next page(s);
- Reference documents used for inspection: UNI EN ISO 14122-3:2010; NF E85-015. SAFETY OF MACHINERY-PERMANENT MEANS OF ACCESS TO MACHINERY: Part 3: Stairs, steploaders and guard-rails.
- Place of inspection & date or period: Udine's industrial area (UD) Italy, 1st December 2014
- Annexes to this certificate: None

The undersigned, inspector to Bureau Veritas, certifies that the hereabove mentioned supply was inspected in conformity with the applicable requirements of the purchase order and the contractual requirements governing the mission entrusted to Bureau Veritas without any remarks.

Inspected by: Name: Edi BULFO Signature: 
 Checked by: Name: Fabio ALFINE Signature: 

Date of issue : 01 DEC. 2014
 Revision date: until 30 NOV. 2015
 Inspection centre: BV PADUA - NORTH EAST AREA - ITALY

INSP 005 En GM SI 101 1/8 Copyright Bureau Veritas 04/2011

LADDERS

Ladders are entirely made of isophthalic resin and fibreglass (FRP) and their wall installation is performed through FRP or stainless steel brackets.

Also the screws for assembling the safety cage are made of stainless steel.

Fixed vertical ladders are of different types:

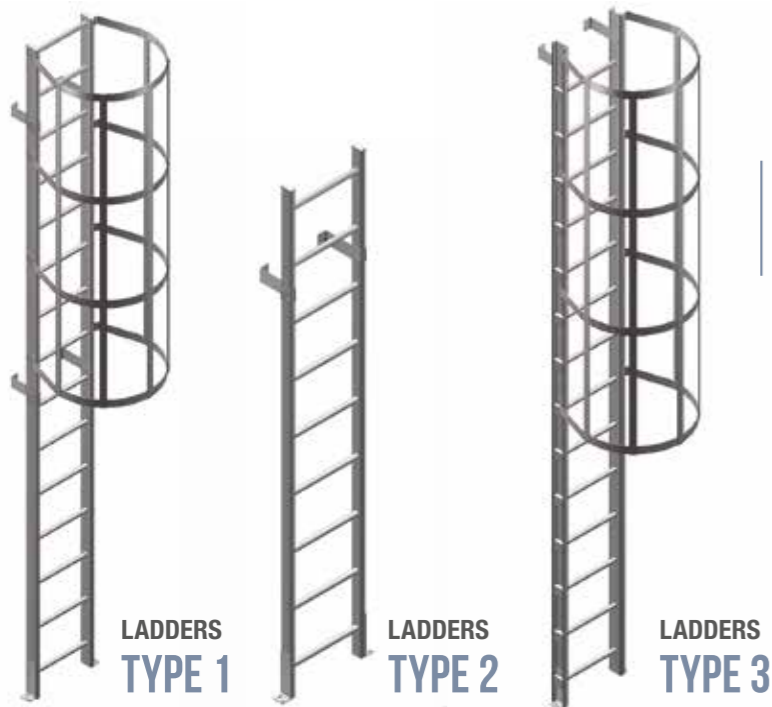
1. **ladders serving machinery or plants** in accordance with UNI EN ISO 14122-1/4 and tested according to UNI EN 131-2 standard;
2. ladders suitable for use in **direct contact with drinking water**;
3. double stringer ladders **for inspection manholes with the CE marking** in accordance with UNI EN 14396 standard.

LIGHTWEIGHT

EASY TO INSTALL

MAINTENANCE-FREE

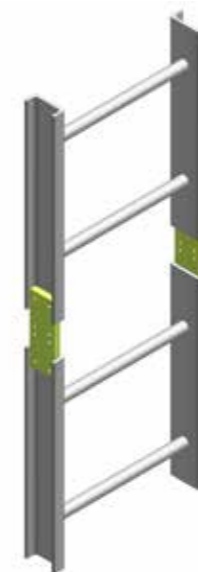
HOW TO CHOOSE A LADDER



The choice between type 1, type 2 or type 3 ladders depends on the scope of use, the length and type of support to which the ladder is to be fixed. Our Technical Department is always available to help the customer to make the best choice.



**JUNCTION
FOR LADDER
TYPE 1**



**JUNCTION
FOR LADDER
TYPE 3**

For lengths over 6.000 mm, ladders are supplied in two parts with a special junction system.

LADDERS

Fixed service ladders are used for inspection and access to machinery and plants and for accessing areas closed by trap doors.

TYPE 01

| CODE | CSCALA1 |
|--------------------------------|---|
| FIXING SUPPORT | rectangular profile 85x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| SAFETY CAGE HOOPS | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 450 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 2.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |

TYPE 02

| CODE | CSCALA2 |
|--------------------------------|---|
| FIXING SUPPORT | rectangular profile tipo 58x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 450 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| MAXIMUM BRACKETS' SPACING | 1.200 mm |
| MAXIMUM RECOMMENDED HEIGHT | 3.000 mm |

TYPE 03

| CODE | CSCALA3 |
|--------------------------------|---|
| FIXING SUPPORT | "C" type profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| SAFETY CAGE HOOPS | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |

*for heights over 6.000 mm it is necessary to separate the ladder into two parts and use the junction element



LADDERS WITH FRONT EXIT

This type of ladder has a widening space at the exit of 1.100 mm in height in order to facilitate the operator's exit and can be supplied with a gate and a safety step.

TYPE 01 WITH FRONT EXIT

| CODE | CSCALA1UF |
|---------------------------------|---|
| FIXING SUPPORT | rectangular profile 85x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| STANDARD SAFETY CAGE HOOPS | diameter 700 mm |
| SAFETY CAGE HOOP FOR FRONT EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 450 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 2.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |
| EXIT AREA | 1.100 mm height from last rung usable width 680 mm |
| SAFETY ACCESSORIES | Safety gate and safety step |



TYPE 03 WITH FRONT EXIT

| CODE | CSCALA3UF |
|---------------------------------|---|
| FIXING SUPPORT | "C" type profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| STANDARD SAFETY CAGE HOOPS | diameter 700 mm |
| SAFETY CAGE HOOP FOR FRONT EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |
| EXIT AREA | 1.100 mm height from last rung usable width 680 mm |
| SAFETY ACCESSORIES | Safety gate and safety step |



*for heights over 6.000 mm it is necessary to separate the ladder into two parts and use the junction element

LADDERS WITH LATERAL EXIT

This type of ladder is used in case of lateral exit compared to the climbing direction.

TYPE 01 WITH LATERAL EXIT

| | |
|--|---|
| CODE | CSCALA1UL |
| FIXING SUPPORT | rectangular profile 85x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| STANDARD SAFETY CAGE HOOP | diameter 700 mm |
| HOOP FOR SAFETY CAGE WITH LATERAL EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 450 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 2.000 mm |
| MAXIMUM LADDER HEIGH | 10.000 mm* |
| EXIT AREA | 1.680 mm over the landing height |

TYPE 03 WITH LATERAL EXIT

| | |
|--|---|
| CODE | CSCALA3UL |
| FIXING SUPPORT | "C" profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface 28x29 mm rectangular profile with non-slip surface |
| STANDARD SAFETY CAGE HOOP | diameter 700 mm |
| HOOP FOR SAFETY CAGE WITH LATERAL EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM LADDER HEIGH | 10.000 mm* |
| EXIT AREA | 1.680 mm over the landing height |

*for heights over 6.000 mm it is necessary to separate the ladder into two parts and use the junction element

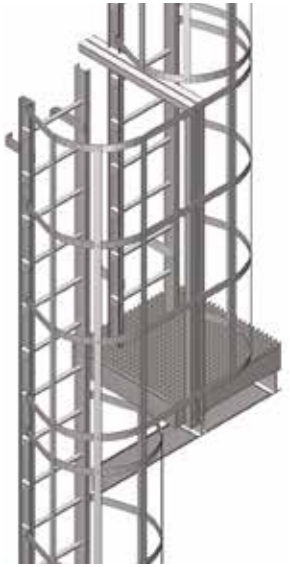


LADDER WITH RESTING PLATFORM

The use of intermediate landing as resting platforms is mandatory for ladders whose height exceeds 10 meters.

RESTING PLATFORM

| | |
|---------------------------------|--|
| MINIMUM WIDTH | 700 mm |
| STRUCTURE | "C" type profile 150x45x8 mm grating type "SCH 52/30" |
| STRUCTURAL BRACKETS | minimum 2 Type "I" profile 150x75x8 mm |
| SAFETY CAGE SUPPORTS | "Q" profile 50x50x5 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILES AND SAFETY CAGE COLOUR | grey RAL 7035 |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| SIDE EXIT HEIGHT | 2.000 mm from last rung |
| MAXIMUM LADDER HEIGHT | 6.000 mm |



LADDERS SUITABLE FOR CONTACT WITH DRINKING WATER

M.M. produces ladders suitable for contact with drinking water pursuant to **Ministerial Decree 174/2004** (implementing the European Directive 98/83/EC DWD - Drinking Water Directive), **certified by the Italian Ministry of Health and by the French General Health Department** ("ACS" - Attestation de Conformité Sanitaire), easily recognizable due to **the profile with red filigree**.



TYPE 03 ACS

| | |
|--------------------------------|---|
| CODE | CSCALA3ACS |
| FIXING SUPPORT | "C" profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| STANDARD SAFETY CAGE HOOP | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 50x4 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 with red filigree |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM LADDER HEIGH | 10.000 mm* |

*for heights over 6.000 mm it is necessary to separate the ladder into two parts and use the junction element



TYPE 03 WITH ACS FRONT EXIT

| | |
|---------------------------------|---|
| CODE | CSCALA3UFACS |
| FIXING SUPPORT | "C" type profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| STANDARD SAFETY CAGE HOOP | diameter 700 mm |
| SAFETY CAGE HOOP FOR FRONT EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 with red filigree |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |
| EXIT AREA | 1.100 mm height from last rung usable width 680 mm |
| SAFETY ACCESSORIES | Safety gate and safety step |

TYPE 03 WITH ACS LATERAL EXIT

| | |
|-----------------------------------|---|
| CODE | CSCALA3ULACS |
| FIXING SUPPORT | "C" type profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| STANDARD SAFETY CAGE HOOP | diameter 700 mm |
| SAFETY CAGE HOOP FOR LATERAL EXIT | diameter 700 mm |
| SAFETY CAGE VERTICAL ELEMENTS | flat profile 40x5 mm |
| PROFILE AND SAFETY CAGE COLOUR | grey RAL 7035 with red filigree |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| SAFETY CAGE TOTAL HEIGHT | total height minus 2.500 mm |
| MAXIMUM HOOPS' SPACING | 1.000 mm |
| MAXIMUM BRACKETS' SPACING | 5.000 mm |
| MAXIMUM HEIGHT | 10.000 mm* |
| EXIT AREA | 1.680 mm over the landing height |

*for heights over 6.000 mm it is necessary to separate the ladder into two parts and use the junction element



LADDERS FOR INSPECTION MANHOLES CE

FRP ladders with the CE marking in accordance with **UNI EN 14396** standard, are intended for fixed and permanent installation inside inspection manholes for waste water, rain water, surface water (subject to specific national regulations) and for the drinking water industry.

To facilitate the entry and exit of the operator, we recommend using a safety extension.

They are **marked with a special label** that identifies them in accordance with **Regulation (EU) 305/2011**.

LADDER FOR INSPECTION MANHOLES TYPE 01

| | |
|---------------------------|---|
| CODE | CSCALA1CE |
| FIXING SUPPORT | rectangular profile 85x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| PROFILE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm* |
| LADDER TOTAL WIDTH | 450 mm* |
| SPACING BETWEEN RUNGS | 300 mm |
| MAXIMUM BRACKETS' SPACING | 3.000 mm |
| MAXIMUM LADDER HEIGHT | 6.000 mm |

*on request they can be supplied with different widths (min 300 max 600 mm)

LADDER FOR INSPECTION MANHOLES TYPE 02

| | |
|---------------------------|---|
| CODE | CSCALA2CE |
| FIXING SUPPORT | rectangular profile 58x25x3 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| PROFILE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm* |
| LADDER TOTAL WIDTH | 450 mm* |
| SPACING BETWEEN RUNGS | 300 mm |
| MAXIMUM BRACKETS' SPACING | 2.100 mm |
| MAXIMUM LADDER HEIGHT | 6.000 mm |

*on request they can be supplied with different widths (min 300 max 600 mm)

LADDER FOR INSPECTION MANHOLES TYPE 03

| | |
|---------------------------|---|
| CODE | CSCALA3CE |
| FIXING SUPPORT | "C" type profile 90x35x8 mm |
| RUNG | 28x21,3 mm diameter with non-slip surface |
| PROFILE COLOUR | grey RAL 7035 |
| RUNG USABLE WIDTH | 400 mm |
| LADDER TOTAL WIDTH | 470 mm |
| SPACING BETWEEN RUNGS | 300 mm |
| MAXIMUM BRACKETS' SPACING | 3.000 mm |
| MAXIMUM LADDER HEIGHT | 6.000 mm |

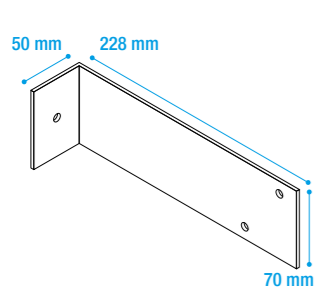


FIXING ACCESSORIES

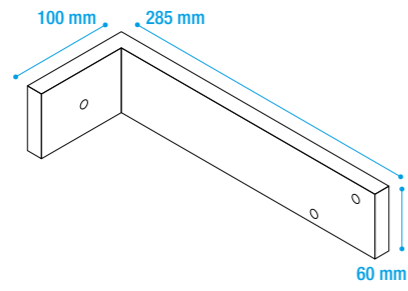
Fixing brackets are available in stainless steel or FRP. In addition to the specified standard sizes, they can also be supplied with different dimensions depending on the type of ladder and type of the support to which they are to be fixed. The Technical Department is always available to assist the customer in defining the correct fixing brackets for the type of ladder and most suitable for the indicated use.

The position of the fixing holes and the size of the counterplates depend on the type of ladder to be installed.

BRACKETS FOR WALL FIXING

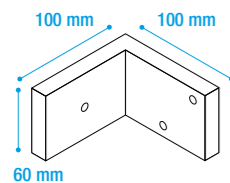


| | |
|-----------|-----------------|
| CODE | 56ASTAFFA5 |
| MATERIAL | stainless steel |
| SIZE | 228x50x70 mm |
| THICKNESS | 3 mm |



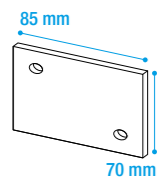
| | |
|-----------|---------------|
| CODE | CSTAFFA12 |
| MATERIAL | FRP |
| SIZE | 285x100x60 mm |
| THICKNESS | 15 mm |

BRACKETS FOR FLOOR FIXING

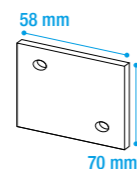


| | |
|-----------|---------------|
| CODE | CSTAFFA13 |
| MATERIAL | FRP |
| SIZE | 100x100x60 mm |
| THICKNESS | 15 mm |

COUNTERPLATES FOR FIXING BRACKETS

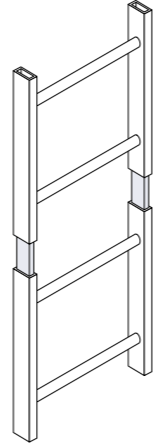


| | |
|-----------|-----------|
| CODE | CPIASTRA1 |
| MATERIAL | FRP |
| SIZE | 85x70 mm |
| THICKNESS | 3 mm |



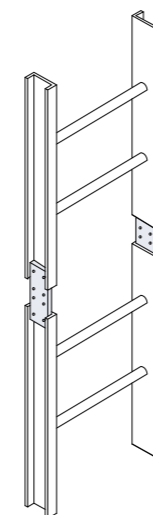
| | |
|-----------|-----------|
| CODE | CPIASTRA2 |
| MATERIAL | FRP |
| SIZE | 58x70 mm |
| THICKNESS | 3 mm |

JOINTS



JOINT FOR LADDER TYPE 1

| | |
|-----------|-------------|
| CODE | CGIUNZIONE1 |
| MATERIAL | FRP |
| SIZE | 200x78 mm |
| THICKNESS | 18 mm |

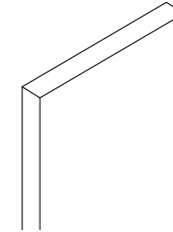


JOINT FOR LADDER TYPE 3

| | |
|-----------|-------------|
| CODE | CGIUNZIONE2 |
| MATERIAL | FRP |
| SIZE | 230x72 mm |
| THICKNESS | 15 mm |

SAFETY CAGE COMPONENTS

FLAT PROFILES



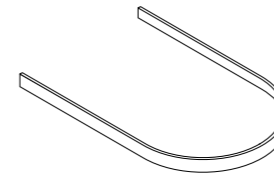
PROFILE 40x5 mm

| | |
|------------|------------------------------------|
| CODE | 53P405I |
| MATERIAL | FRP |
| DIMENSIONS | 40x5 mm standard bar length 6 m |
| WEIGHT | 0,36 kg/m |
| COLOUR | grey RAL 7035 |

PROFILE 40x5 mm ACS

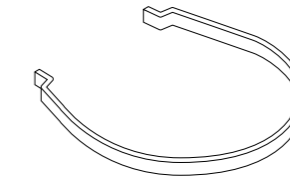
| | |
|------------|------------------------------------|
| CODE | 53P504IX |
| MATERIAL | FRP |
| DIMENSIONS | 50x4 mm standard bar length 6 m |
| WEIGHT | 0,36 kg/m |
| COLOUR | grey RAL 7035 with red filigree |

HOOPS



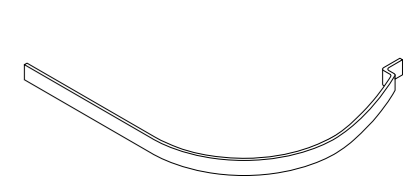
HOOP FOR FRONT EXIT*

| | |
|------------|------------------------|
| CODE | 5506CERCHIO7035 |
| MATERIAL | FRP |
| DIMENSIONS | Ø 700 mm L 1.200 mm |
| WEIGHT | 1,30 kg |
| COLOUR | grey RAL 7035 |



STANDARD HOOP*

| | |
|------------|-----------------|
| CODE | 5504CERCHIO7035 |
| MATERIAL | FRP |
| DIMENSIONS | Ø 700 mm |
| WEIGHT | 0,90 kg |
| COLOUR | grey RAL 7035 |



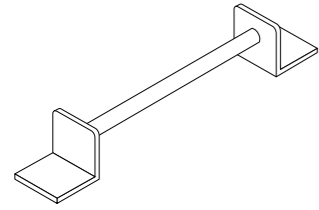
HOOP FOR LATERAL EXIT*

| | |
|------------|------------------------|
| CODE | 5505CERCHIO7035 |
| MATERIAL | FRP |
| DIMENSIONS | Ø 700 mm L 1.200 mm |
| WEIGHT | 1,00 kg |
| COLOUR | grey RAL 7035 |

*also available ACS type

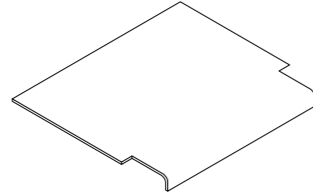
SAFETY ACCESSORIES

HANDLE



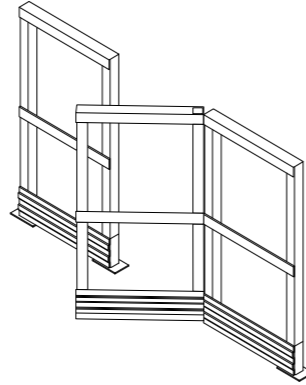
| | |
|----------|-------------------|
| CODE | CMANIGLIAFRP |
| MATERIAL | FRP |
| SIZE | max length 440 mm |
| COLOUR | grey RAL 7035 |

SAFETY STEP



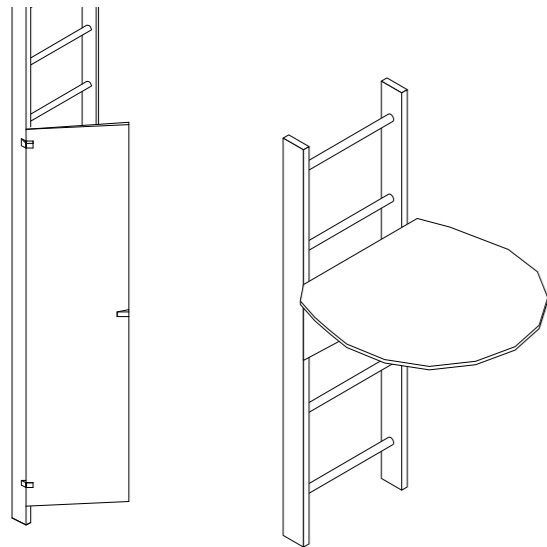
| | |
|----------|------------|
| CODE | 55STCN40 |
| MATERIAL | FRP |
| SIZE | 470x345 mm |
| COLOUR | 4 mm |

GATE



| | |
|----------|------------------------|
| CODE | CPORTELLO |
| MATERIAL | FRP with spring hinges |
| SIZE | max length 800 mm |
| COLOUR | grey RAL 7035 |

LADDER CLOSURE



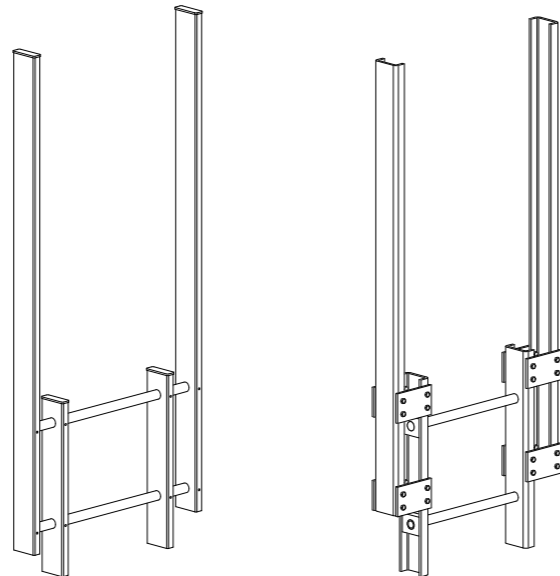
VERTICAL CLOSURE

| | |
|----------|------------------|
| CODE | CCHIUSURASCALA1 |
| MATERIAL | FRP |
| SIZE | 2.000x450/470 mm |
| COLOUR | grey RAL 7035 |

HORIZONTAL CLOSURE

| | |
|----------|-----------------|
| CODE | CCHIUSURASCALA2 |
| MATERIAL | FRP |
| SIZE | Ø 700 mm |
| COLOUR | grey RAL 7035 |

WIDENING SPACE FOR LADDERS

WIDENING
FOR LADDER TYPE 1

| | |
|----------|---------------|
| CODE | GSLARG01 |
| MATERIAL | FRP |
| COLOUR | grey RAL 7035 |

WIDENING
FOR LADDER TYPE 3

| | |
|----------|---------------|
| CODE | GSLARG03 |
| MATERIAL | FRP |
| COLOUR | grey RAL 7035 |



Fences are made with fibreglass gratings and profiles and are mostly suited for use in areas where **electrical isolation, resistance to chemical or atmospheric agents are required.**

They are also an excellent solution for the airport sector for their **non-magnetic and radiolucency properties.**

Standard colours are grey or green, but on request they can be supplied in different colours. The top extension arm is also available on request.

Our Technical Department can provide customized solutions for fences designed to meet particular customer needs both in terms of size and in terms of shape of the fence.

MODULAR

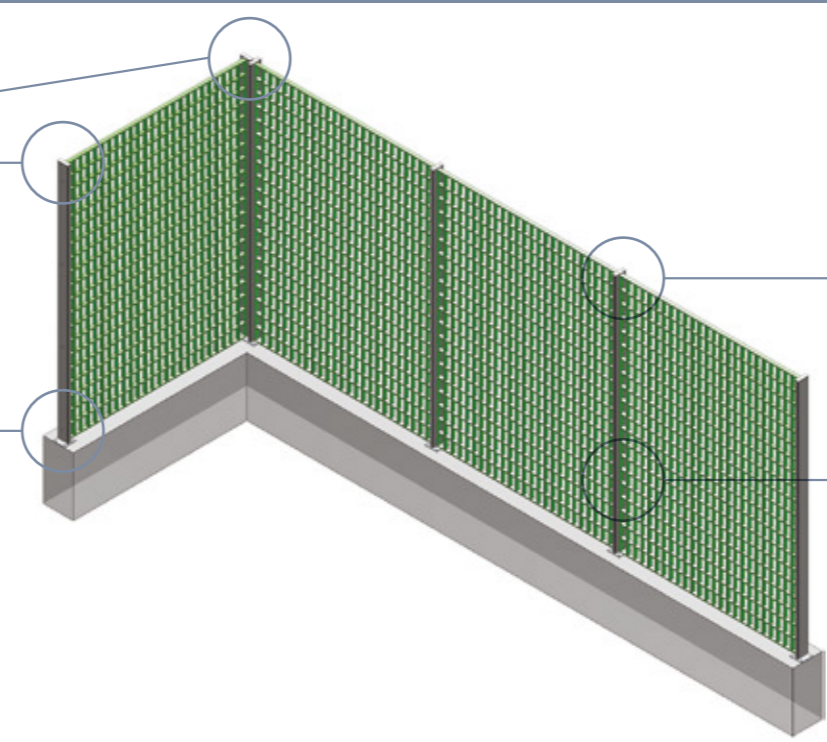
DIELECTRIC

QUICK AND EASY TO INSTALL

FENCE ELEMENTS

The spacing between the stanchions varies according to the type of grating used.

The stanchions can be anchored in concrete for a depth of at least 30 cm or fixed to the base unit using stainless steel base plates.



The top of the stanchions are closed with a plastic cap.

The panel is fixed to the stanchions with self-locking screws and nuts or anti-unscrewing nuts in AISI 316 stainless steel.

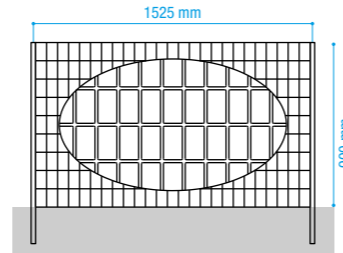
CHOOSE THE PAINT FINISH FOR A BETTER AESTHETIC RESULT

FENCES

All fences are designed by the Technical Department in order to optimize the cost-performance ratio. They are made of **modular elements** and are factory **pre-drilled**, thus allowing quick and simple assembly operations.

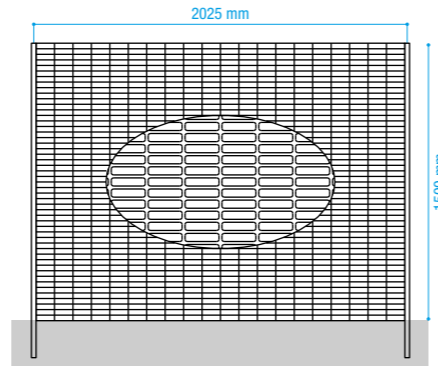
TYPE 01

| | |
|-----------------------------|---|
| GRATING | SCH60/25, mesh 100x60 mm, thickness 25 mm |
| PANEL SIZE | 1.500x900 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 1.525 mm |



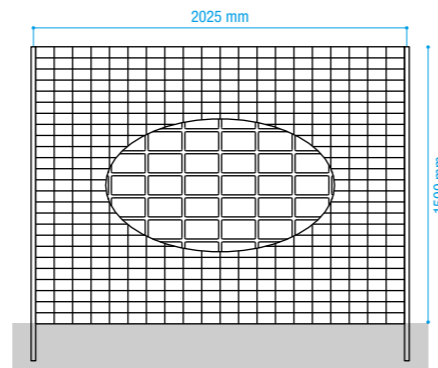
TYPE 07

| | |
|-----------------------------|---|
| GRATING | SCH30/28, mesh 100x30 mm, thickness 28 mm |
| PANEL SIZE | 2.000x1.500 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 2.025 mm |



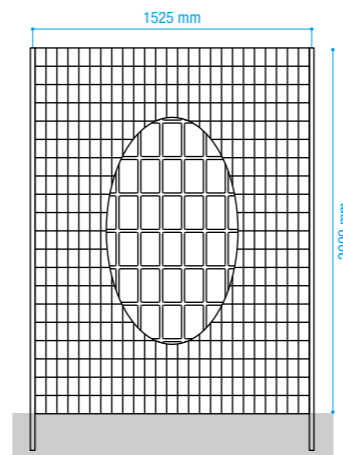
TYPE 09

| | |
|-----------------------------|---|
| GRATING | SCH60/25, mesh 100x60 mm, thickness 25 mm |
| PANEL SIZE | 2.000x1.500 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 2.025 mm |



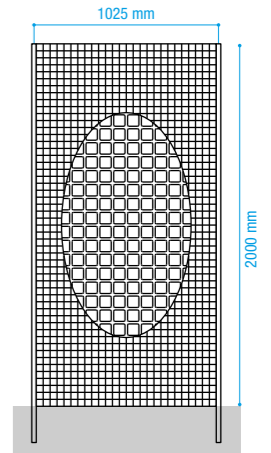
TYPE 10

| | |
|-----------------------------|---|
| GRATING | SCH60/25, mesh 100x60 mm, thickness 25 mm |
| PANEL SIZE | 1.500x2.000 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 1.525 mm |



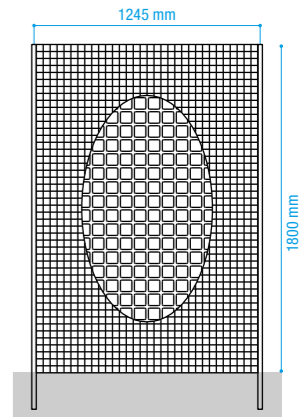
TYPE 11

| | |
|-----------------------------|--|
| GRATING | SCH38/25, mesh 38x38 mm, thickness 25 mm |
| PANEL SIZE | 1.000x2.000 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 1.025 mm |



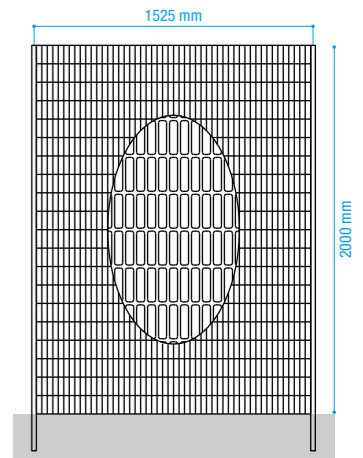
TYPE 12

| | |
|-----------------------------|--|
| GRATING | SCH38/25, mesh 38x38 mm, thickness 25 mm |
| PANEL SIZE | 1.220x1.800 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 1.245 mm |



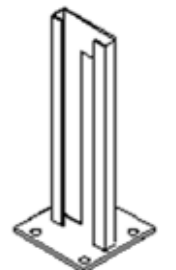
TYPE 13

| | |
|-----------------------------|---|
| GRATING | SCH30/28, mesh 100x30 mm, thickness 28 mm |
| PANEL SIZE | 1.500x2.000 mm |
| FRP RECTANGULAR PROFILE | 85x25x3 mm |
| DISTANCE BETWEEN STANCHIONS | 1.525 mm |



STANCHION BASE PLATE

| | |
|----------|--|
| CODE | 56ASTAFFA9 |
| SIZE | base unit 100x100 mm housing 77x19x250 mm |
| MATERIAL | stainless steel |
| WEIGHT | 750 g |





Gates are made of profiles, fibreglass gratings and stainless steel accessories. The swing leaves size can be adapted to customer needs.

- Gates are available in the following versions:
- gates for driveways with double swing and manual closing - CE marked
 - pedestrian gates with single swing and manual closing

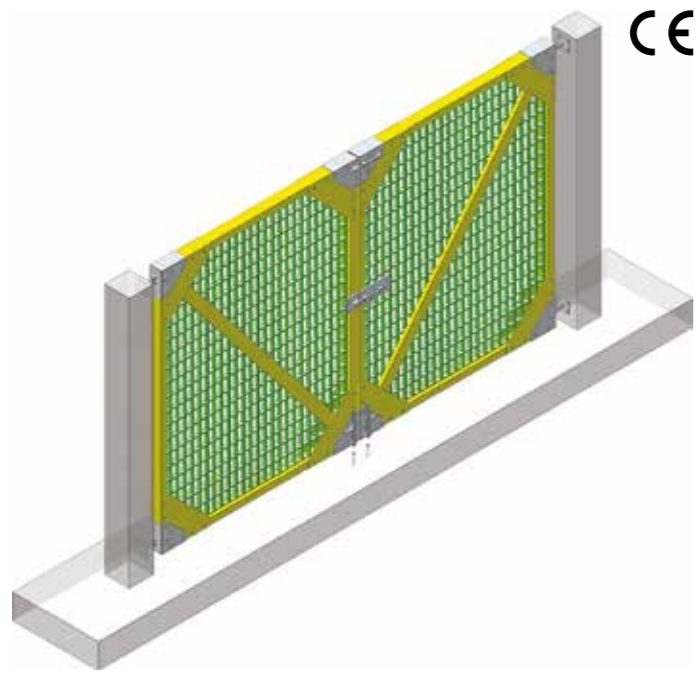
FRP gates for driveways bear the CE marking in compliance with Regulation (EU) No. 305/2011. Tested in accordance with **UNI EN 13241-1** standard.

LIGHTWEIGHT

DIELECTRIC

CE MARKED

GATE TYPES

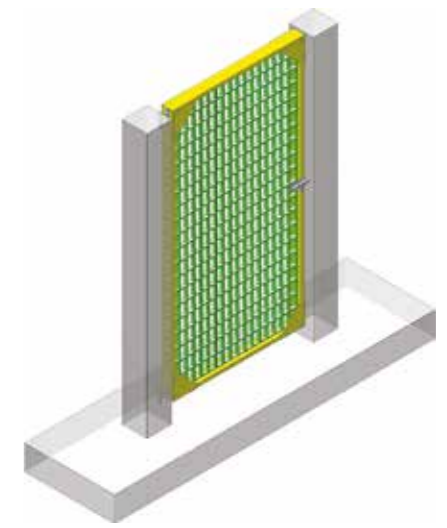


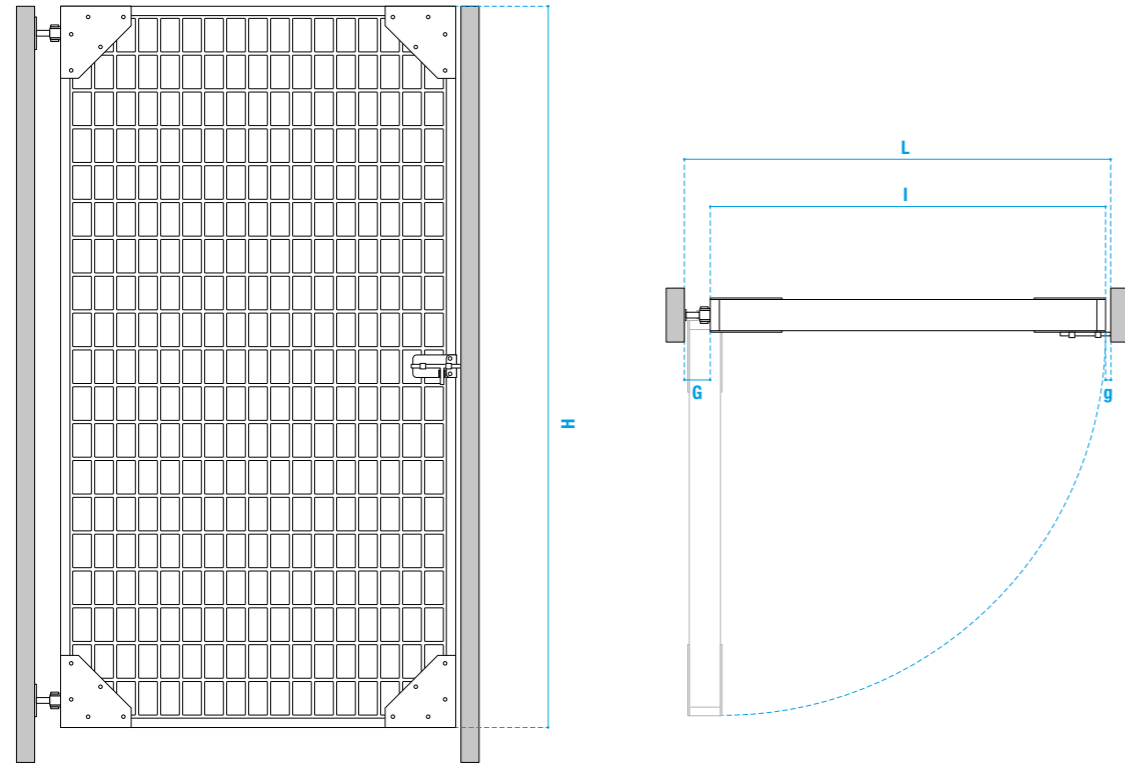
DOUBLE SWING DRIVEWAY GATES

| CODES | CCANC1 e CCANCE |
|--------------------|---|
| STRUCTURAL PROFILE | FRP rectangular profile 80x50x5 mm, grey colour |
| INNER STRUCTURE | FRP grating or profiles, grey colour |
| GATE HINGES | stainless steel |
| CLOSING LATCHES | stainless steel |

SINGLE SWING PEDESTRIAN GATE

| CODES | CCANC2 |
|--------------------|---|
| STRUCTURAL PROFILE | FRP grating or profiles 80x50x5 mm, grey colour |
| GATE STANCHION | FRP grating or profiles 80x50x5 mm |
| INNER STRUCTURE | FRP grating or profiles, grey colour |
| GATE HINGES | stainless steel |
| CLOSING LATCHES | stainless steel |

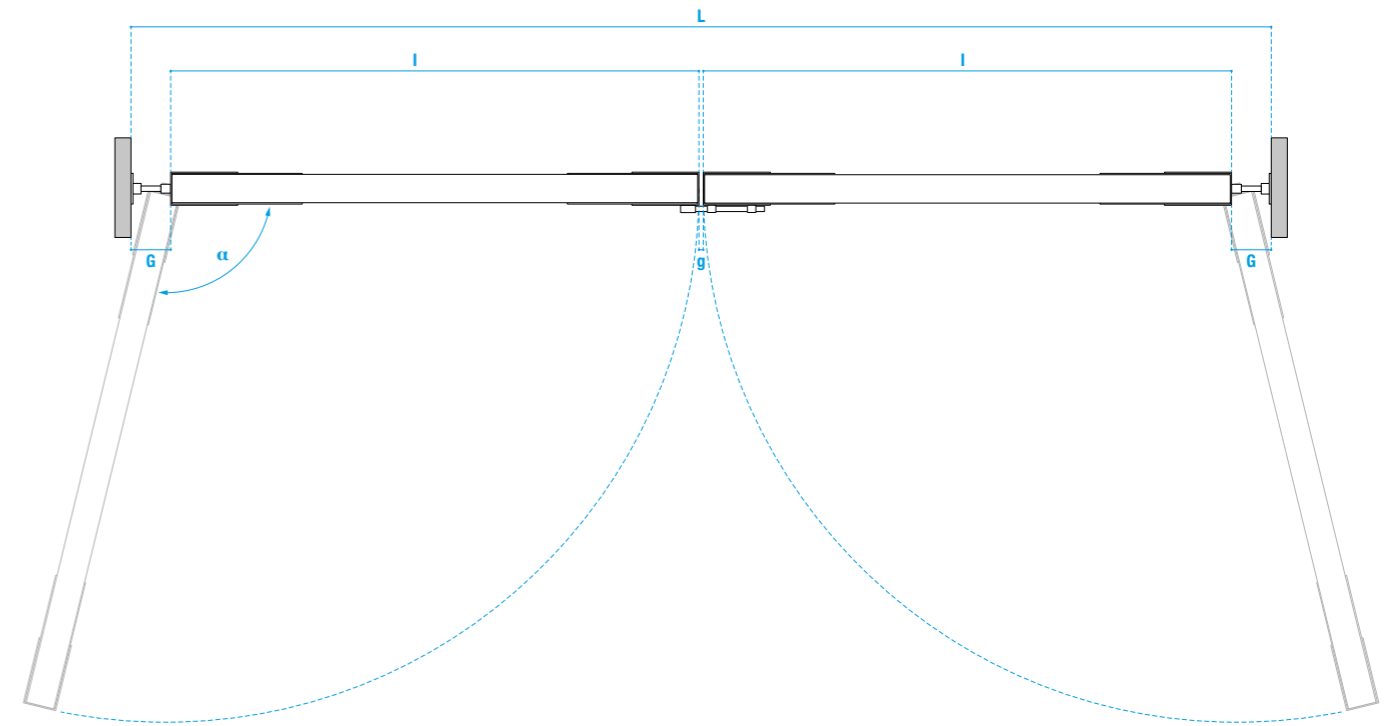
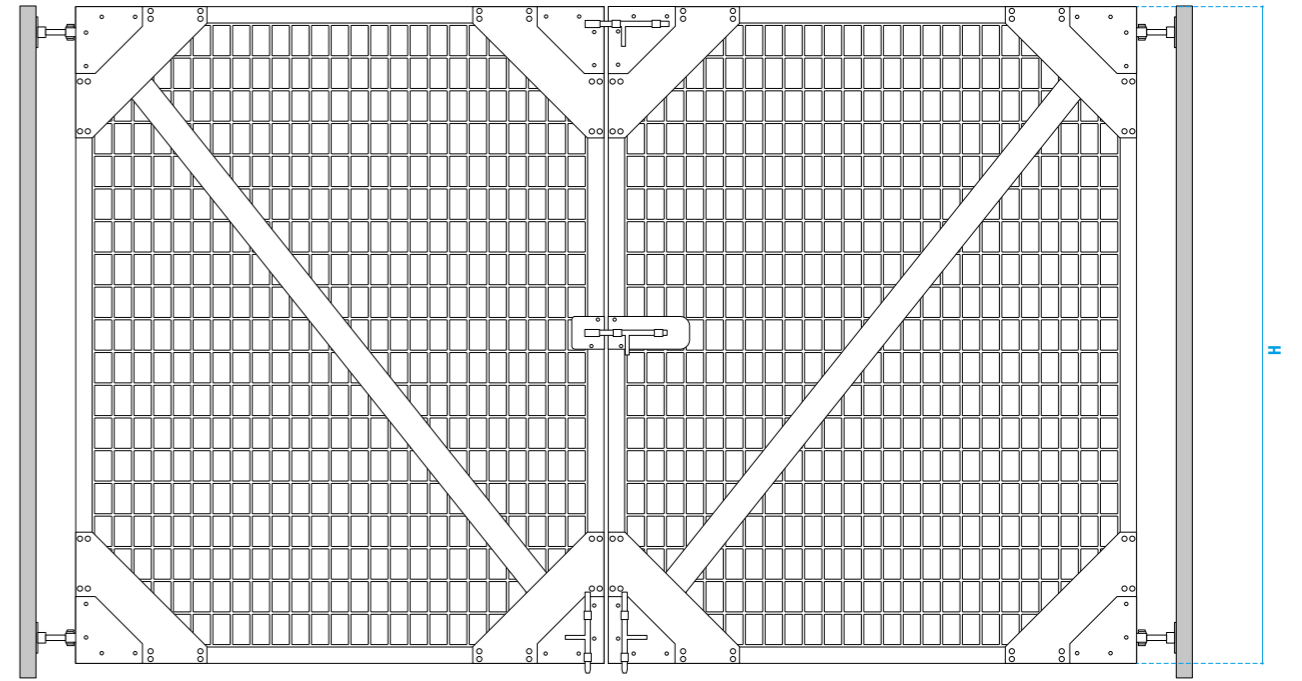




STANDARD SIZE FOR 1 SWING GATE

| L CLEARANCE WIDTH | I SWING WIDTH | G HINGE OVERALL DIMENSIONS | g SPACE BETWEEN SWINGS | H SWING HEIGHT | GRATING WIDTH | GRATING HEIGHT |
|----------------------|------------------|-------------------------------|---------------------------|-------------------|------------------|-------------------|
| 1.516 mm | 1.449 mm | 70 mm | 15 mm | 1.950 mm | 1.381 mm | 1.900 mm |
| 1.216 mm | 1.150 mm | 70 mm | 15 mm | 1.950 mm | 1.082 mm | 1.900 mm |
| 1.037 mm | 971 mm | 70 mm | 15 mm | 1.950 mm | 903 mm | 1.900 mm |

Size of gates with grating SCH60/25



STANDARD SIZE FOR 2 SWINGS GATE

| L CLEARANCE WIDTH | I SWING WIDTH | G HINGE OVERALL DIMENSIONS | g SPACE BETWEEN SWING | H SWING HEIGHT | GRATING WIDTH | GRATING HEIGHT |
|----------------------|------------------|-------------------------------|--------------------------|-------------------|------------------|-------------------|
| 3.000 mm | 1.367 mm | 126 mm | 14 mm | 2.000 mm | 1.261 mm | 1.900 mm |
| 4.000 mm | 1.852 mm | 141 mm | 14 mm | 2.000 mm | 1.746 mm | 1.900 mm |
| 5.000 mm | 2.389 mm | 104 mm | 14 mm | 2.000 mm | 2.283 mm | 1.900 mm |
| 6.000 mm | 2.897 mm | 126 mm | 14 mm | 2.000 mm | 2.761 mm | 1.900 mm |

Size of gates with grating SCH60/25

08

COMPLEX STRUCTURES



Stairways, walkways and work platforms are built with pultruded profiles, FRP gratings and stainless steel accessories in accordance with EN ISO 14122 standard (Permanent means of access to machinery) within the framework of Directive 2006/42/EC (Machinery Directive).

They have been conceived and designed to meet the needs of each customer. They are entirely prefabricated in the factory and supplied in pre-assembled modules.

Thanks to their lightweight (the specific weight of fibreglass is about 1/5 of that of steel) they can easily be installed on existing structures, without these having to be modified. The absence of maintenance and durability ensure a drastic reduction in operating costs.

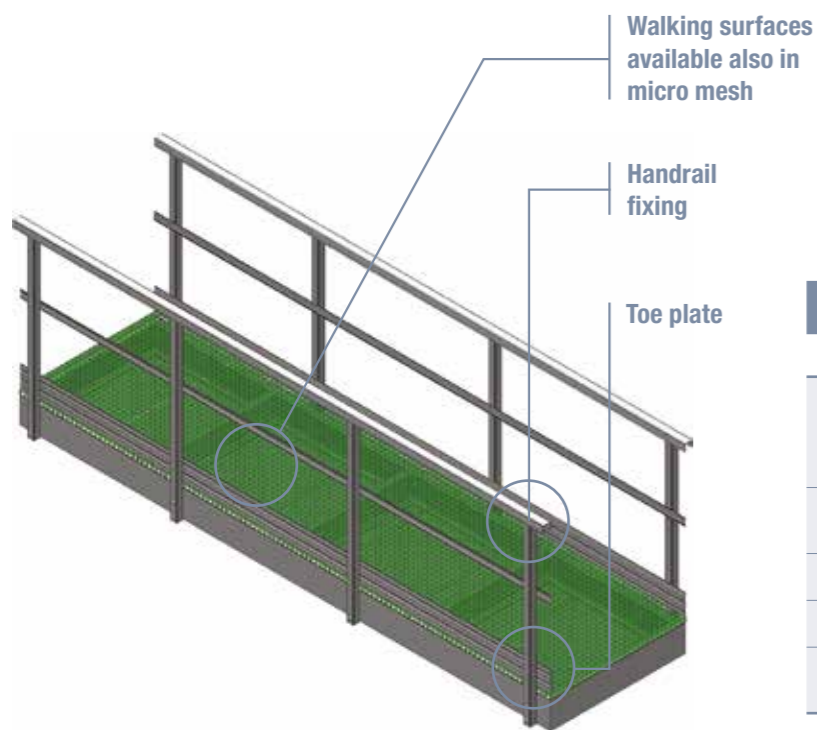
The characteristics of the materials used and the careful planning allow to create safe structures in compliance with the latest regulations in the field.

DESIGNED TO MEET SPECIFIC NEEDS

PREFABRICATED

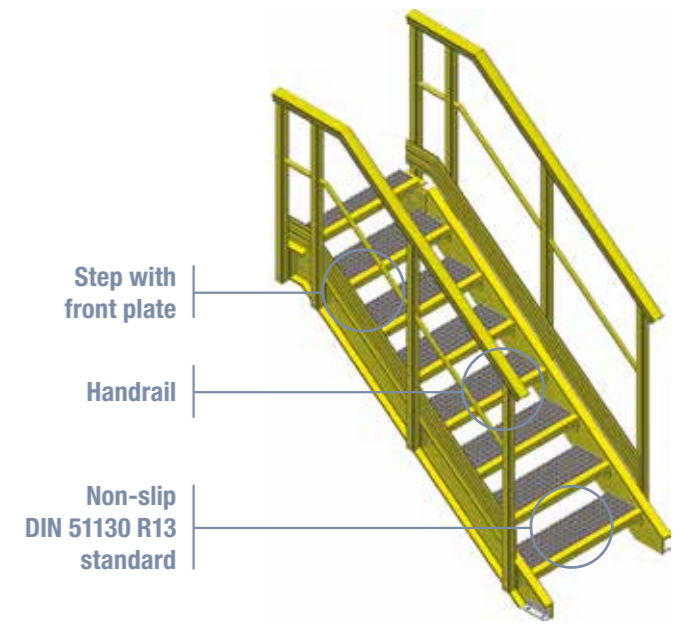
PRE-ASSEMBLED MODULES

WALKWAY STAIRWAY



| WALKWAYS | | |
|---------------------------|--|--|
| STRUCTURE | "C" type profile "C" type profile "I" type profile "I" type profile | 300x100x15 mm 150x45x8 mm 200x100x10 mm 150x75x8 mm |
| HANDRAIL | "C" type profile ergonomic profile | 60x50x5 mm 60x60x5 mm |
| HANDRAIL STANCHION | "Square" profile | 50x50x5 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| KNEERAIL | "Shaped" profile "Tubular" type profile | 55x5 mm Ø 26x19 mm |

| STAIRWAYS | | |
|---------------------------|--|--|
| STRINGERS | C" type profile | 300x100x15 mm 200x60x10 mm 150x45x8 mm |
| HANDRAIL | "C" type profile ergonomic profile | 60x50x5 mm 60x60x5 mm |
| HANDRAIL STANCHION | "Square" profile | 50x50x5 mm |
| TOE PLATE | "Shaped" profile | 150x5 mm |
| KNEERAIL | "Shaped" profile "Tubular" type profile | 55x5 mm Ø 26x19 mm |



TECHNICAL AND ENGINEERING SERVICES

Safe access to machinery and/or parts of plants could be a difficult problem to solve.

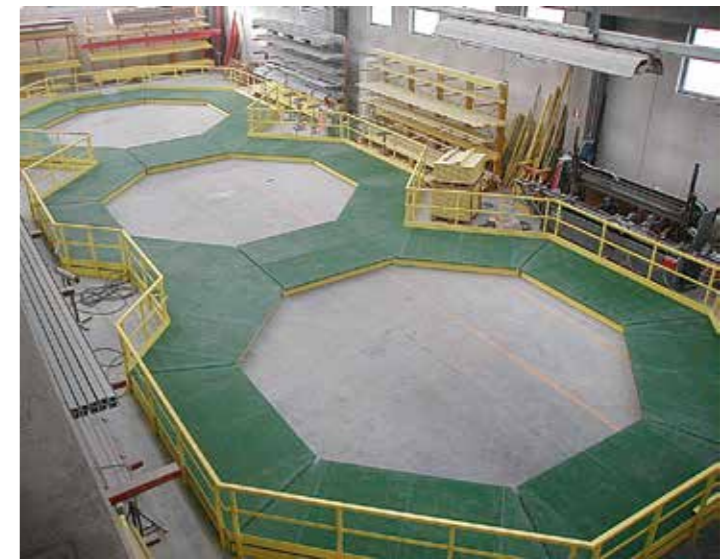
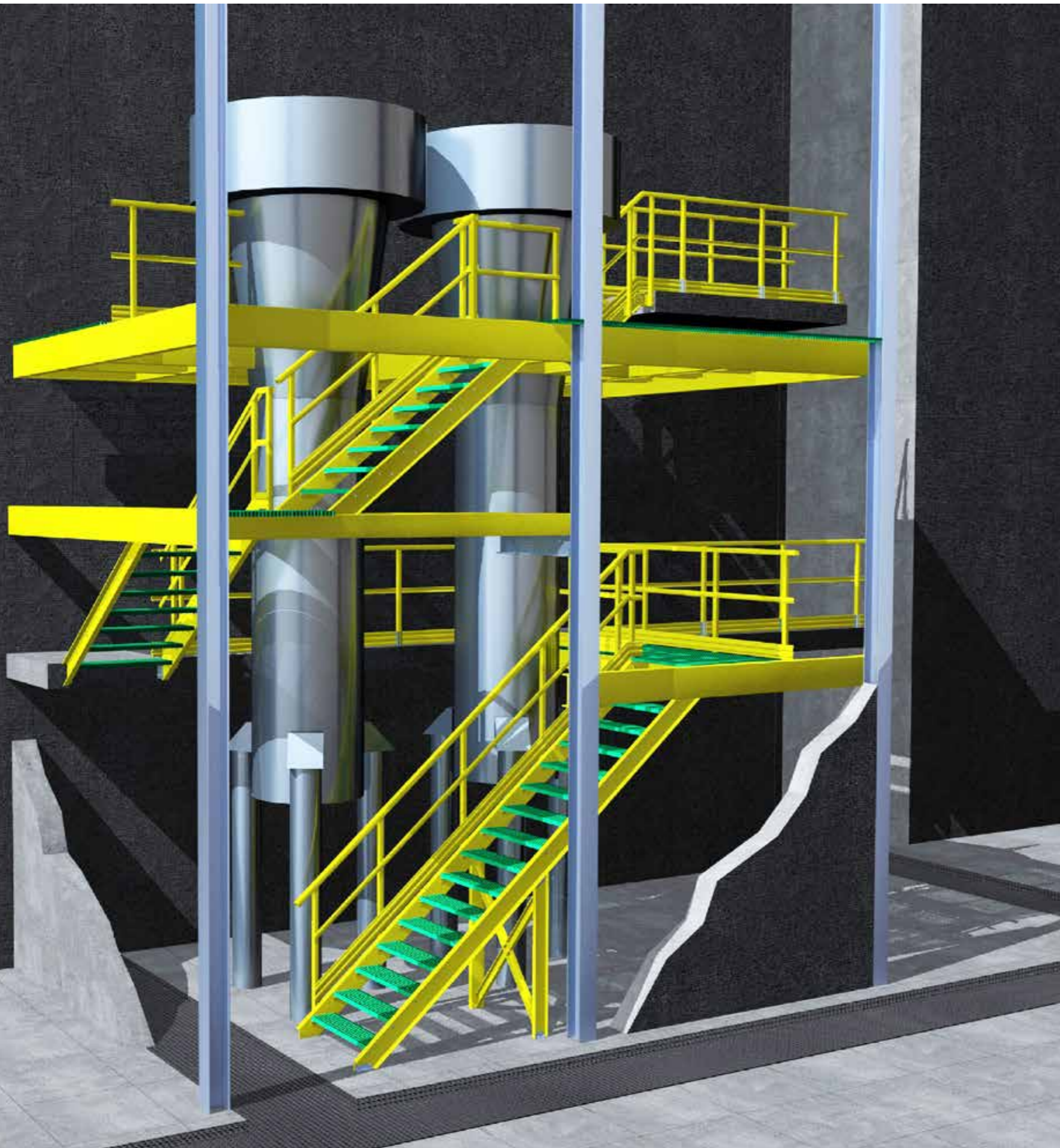
The solution is our structures.

M.M. Technical Department takes care of customers' requests also through inspections, identifies the best solution, taking into account the specific customer needs, and paying special attention to compliance with safety standards.

For the analysis and design of the structures we use the **most advanced finite element modelling software (FEM)**.

In addition, we are able to provide both **2D graphic drawings and 3D graphic renderings and models** through appropriate drawing software.

The construction drawings and assembly instructions complete the service and ensure that the structures are installed correctly so as to guarantee long-term benefits to the end customer.



THE BENEFITS OF FRP STRUCTURES



LIGHTWEIGHT

A lower load on the substructures means that they can be installed on existing structures without requiring their modifications. The reduced weight to handle makes moving and installation easy.



ABSENCE OF MAINTENANCE

They ensure a reduction in operating costs due to their resistance to chemical and atmospheric agents. Always available and safe for operators.



SAFETY

The non-slip walking surfaces, the certified handrail systems, the scrupulous design with attention to ergonomic principles, make them very safe for the operators.



DIELECTRICITY

They do not require earthing or protection against electric shock.



PREFABRICATION/PRE-ASSEMBLY

The structures are verified in the factory due to their complete prefabrication. The supply in preassembled modules simplifies and speeds up installation times.



WORKABILITY

Any adjustment on site is simple and fast using just ordinary tools.



COST-EFFECTIVENESS

Considering the significantly lower installation and management costs, they are economically more convenient than similar structures in different materials.



The threaded rods, nuts and washers, made from **glass-fibre reinforced epoxy resin**, are electrical insulators and non-magnetic. On request they can be supplied in vinylester or in isophtalic resin.

The metric screw thread rods are available in the standard length of 2.200 mm and can also be supplied cut to size.

FRP fixing systems are the ideal solution for the many applications where dielectricity and high corrosion resistance are required.

DIELECTRIC

RESISTANT TO CORROSION

HIGH AXIAL RESISTANCE

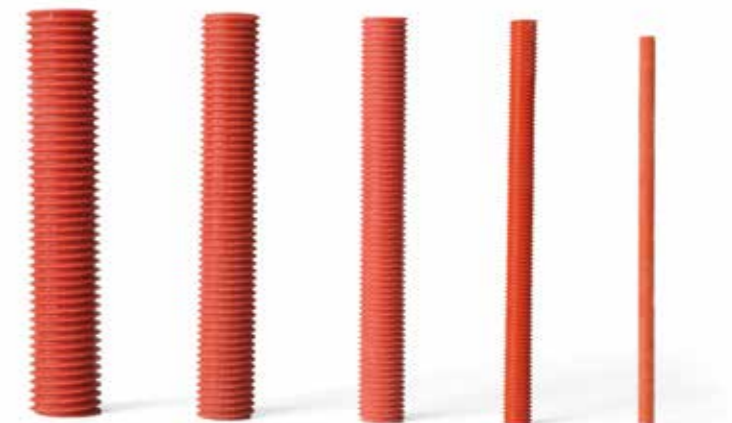
THREADED RODS

MECHANICAL RESISTANCE TABLE

| TYPE | TOLERANCES | ULTIMATE TENSILE STRENGTH (N) 180°C (CLASS H) | | | ULTIMATE TORSION VALUE (Nm) NON LUBRICATED THREADED RODS | |
|------|------------|--|--------|--------|---|-----------------|
| | | H=1A | H=1.5A | H=2A | WITH WASHERS | WITHOUT WASHERS |
| M8 | 0 / -0,20 | 5.300 | 8.600 | 11.000 | 13 | 10 |
| M10 | 0 / -0,25 | 9.500 | 14.300 | 20.000 | 25 | 20 |
| M12 | 0 / -0,30 | 13.500 | 20.300 | 30.000 | 45 | 35 |
| M14 | 0 / -0,30 | 25.500 | 30.000 | 42.500 | 75 | 55 |
| M16 | 0 / -0,30 | 35.300 | 43.700 | 55.000 | 100 | 85 |
| M18 | 0 / -0,30 | 40.100 | 54.300 | 68.000 | 125 | 115 |
| M20 | 0 / -0,30 | 49.500 | 67.200 | 80.000 | 162 | 150 |

| Ø | STANDARD LENGTH |
|------|-----------------|
| M5* | 2.200 mm |
| M6 | 2.200 mm |
| M8 | 2.200 mm |
| M10 | 2.200 mm |
| M12 | 2.200 mm |
| M14 | 2.200 mm |
| M15 | 2.200 mm |
| M18 | 2.200 mm |
| M20 | 2.200 mm |
| M22* | 2.200 mm |
| M24* | 2.200 mm |

*items not in stock and available on request

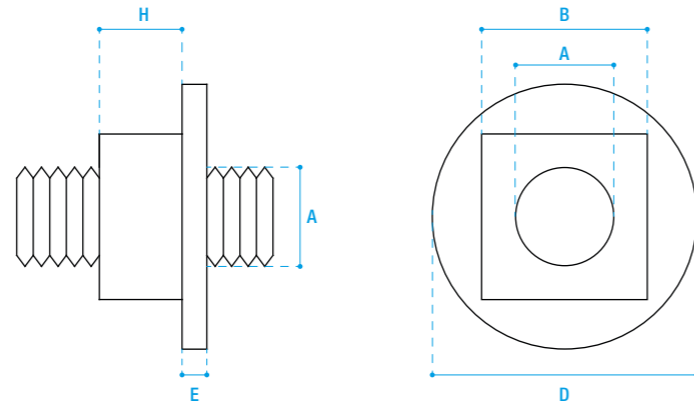


NUTS

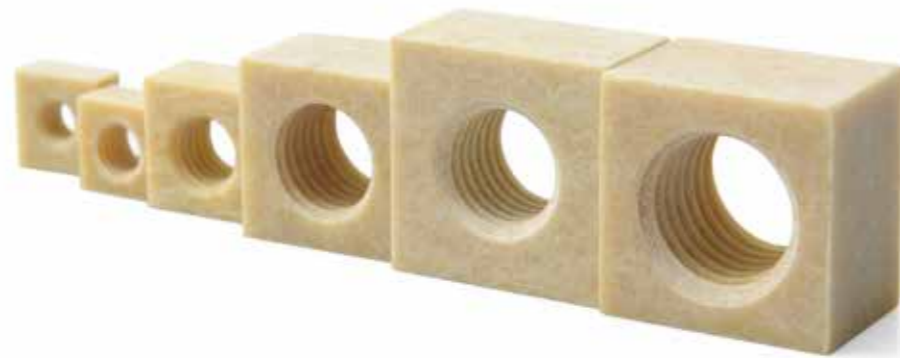
SQUARE SIZE 1 X Ø

| Ø | SIZE BxBxH |
|------|-------------|
| M5* | 10x10x5 mm |
| M6 | 17x17x6 mm |
| M8 | 17x17x8 mm |
| M10 | 19x19x10 mm |
| M12 | 22x22x12 mm |
| M14 | 24x24x14 mm |
| M16 | 27x27x16 mm |
| M18 | 30x30x16 mm |
| M20 | 32x32x20 mm |
| M22* | 36x36x22 mm |
| M24* | 41x41x24 mm |

*items not in stock and available on request



A = rod Ø / threaded rod
 B = nut side (spanner)
 D = washer diameter
 E = washer thickness
 H = nut height



WASHERS

| TYPE* | D | E |
|-------|---------|--------|
| RM6 | 10,5 mm | 2,5 mm |
| RM8 | 18,5 mm | 2,5 mm |
| RM10 | 22 mm | 2,5 mm |
| RM12 | 26 mm | 2,5 mm |
| RM14 | 30 mm | 2,5 mm |
| RM16 | 31 mm | 3,0 mm |
| RM18 | 48 mm | 5 mm |
| RM20 | 51 mm | 5 mm |

*other types of washers available on request



THREADED RODS - NUTS - WASHERS

| TECHNICAL CHARACTERISTICS | | STANDARDS | MEASURE UNIT | VALUE |
|---------------------------|--|-------------|----------------------------------|---------------|
| MECHANICAL PROPERTIES | Flexural strength at rupture perpendicular to laminations | ISO 178 | MPa | 450 |
| | Apparent modulus of bending elasticity | ISO 178 | MPa | 26.000 |
| | Compression strength perpendicular to lamination | ISO 604 | MPa | 400 |
| | Impact strength (IZOD) parallel to lamination | ISO 108 | kJ/m ² | 50 |
| | Tensile strength | ISO 527 | MPa | 450 |
| | Delamination resistance | CEI | N | 8.000 |
| | Compression strength | ISO 604 | MPa | - |
| DIELECTRIC PROPERTIES | Cohesion between layers | EN61212-2 | Mpa | - |
| | Electrical stiffness at 90°C perpendicular to stratifications (thickness 3 mm) | IEC 243-1 | kV/mm | 15 |
| | Penetration voltage, at 90°C parallel to laminations | IEC 243-1 | kV | 60 |
| | Permittivity at 48-68 Hz | IEC 250 | - | 5,5 |
| | Dissipation factor at 48-62 Hz | IEC 251 | - | 0,04 |
| | Comparative tracking index | IEC 112 | CIT | >600 |
| | Dry arc resistance | ASTM D 495 | sec. | >180 |
| FIRE RESISTANCE | Ignition time | ASTM D 229 | sec. | 200 |
| | Flame-out time | ASTM 229 | sec. | 60 |
| | Flammability | UL 94 | class | V0 |
| | Specific smokes optical density | ASTM E 662 | - | in conformity |
| | Determination of gas combustion, toxicity index | CEI 20.37/7 | - | in conformity |
| THERMAL PROPERTIES | Thermal conductivity | ISO 8302 | W/mK | 0,3 |
| | Linear expansion coefficient | VDE 0304/2 | 10 ⁻⁶ K ⁻¹ | 10-20 |
| CHEMICAL PROPERTIES | Density | ISO 1183 | g/cm ³ | 1,9-2,0 |
| | Water absorption (thickness 3 mm) | ISO 62 | mg | 22 |





FRP laminated sheets are made of fibreglass and polyester resin. They can be supplied with a quartz non-slip surface certified in accordance with DIN 51130 standard.

They can be shaped and cut to size according to the specific customer's requests. The standard colour is grey but, on request, they can be made in other colours.

They are used as **fillers** and **covering elements for walkways**, even in concrete, especially in the electrical and telecommunication sectors.

DIELECTRICS

NON-SLIP

EASY TO WORK

FINISHINGS



SMOOTH FINISHING

non-slip R10
DIN 51130 standard



QUARTZ FINISHING

non-slip R13
DIN 51130 standard



Q-PAINT FINISHING

non-slip for bare feet
DIN 51097 standard

| | |
|----------------|----------------------|
| CODE | SCHM01IFR |
| THICKNESS | from 3 to 20 mm |
| STANDARD SHEET | 1.220x4.038 mm |
| DENSITY | 1,7 g/m ³ |
| COLOUR | grey RAL 7004 |

Other colours available on request.
Available cut to size sheets.



Graphic project
Interlaced srl

M.M. SRL

ADMINISTRATIVE OFFICE AND PRODUCTION PLANT
Via Antonio Zanussi, 300/302, 33100 Udine - Italy
ph. +39 0432 522970 - fax +39 0432 522253

info@mmgrigliati.it - VAT No. and Tax Code: 02984500302

PRODUCTION PLANT

Via Antonio Zanussi, 311, 33100 Udine - Italy

WWW.MMGRIGLIATI.COM

**COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =**